THE LANCET

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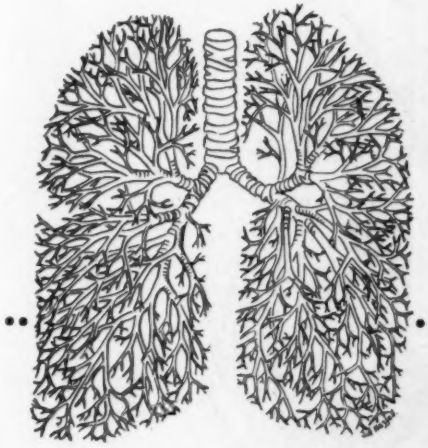

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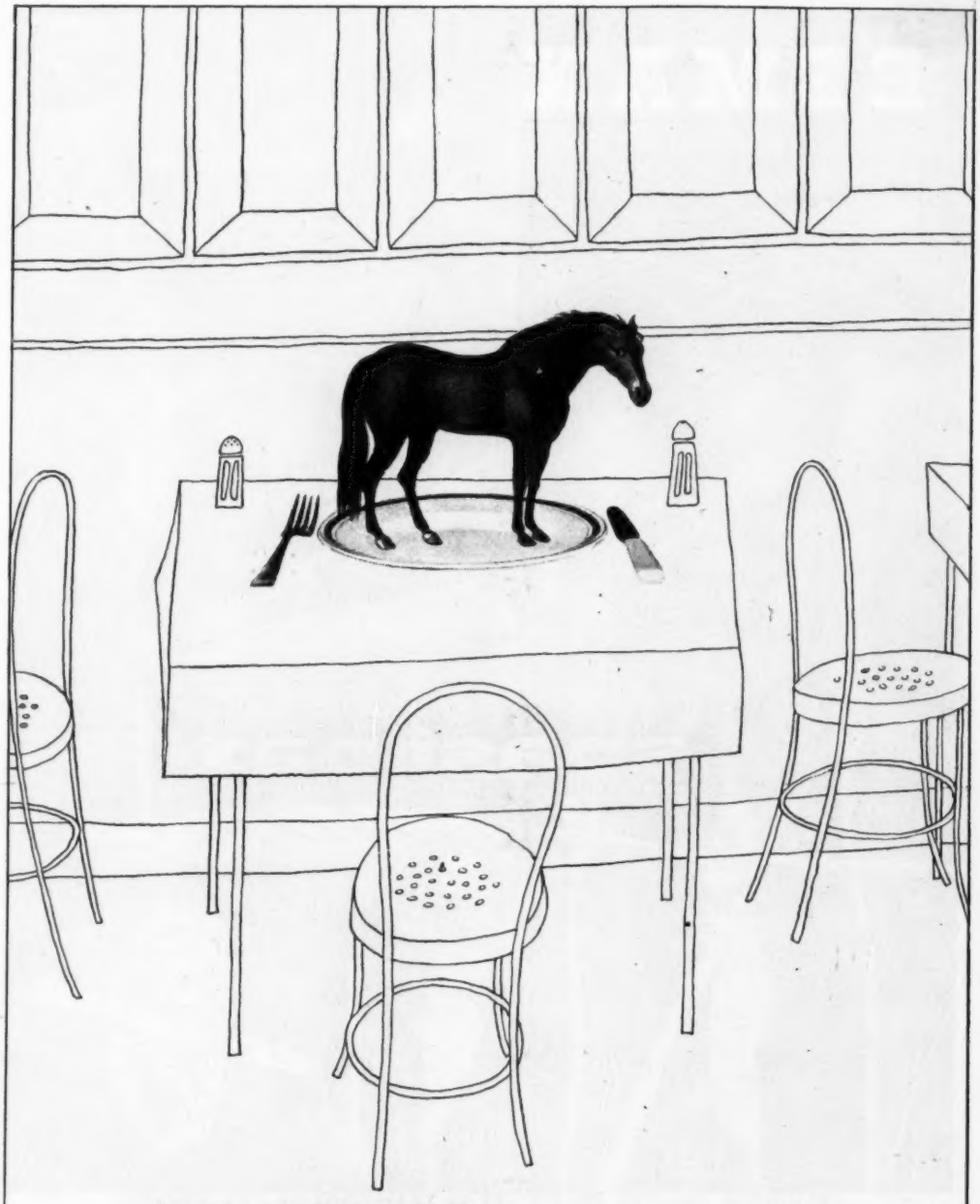

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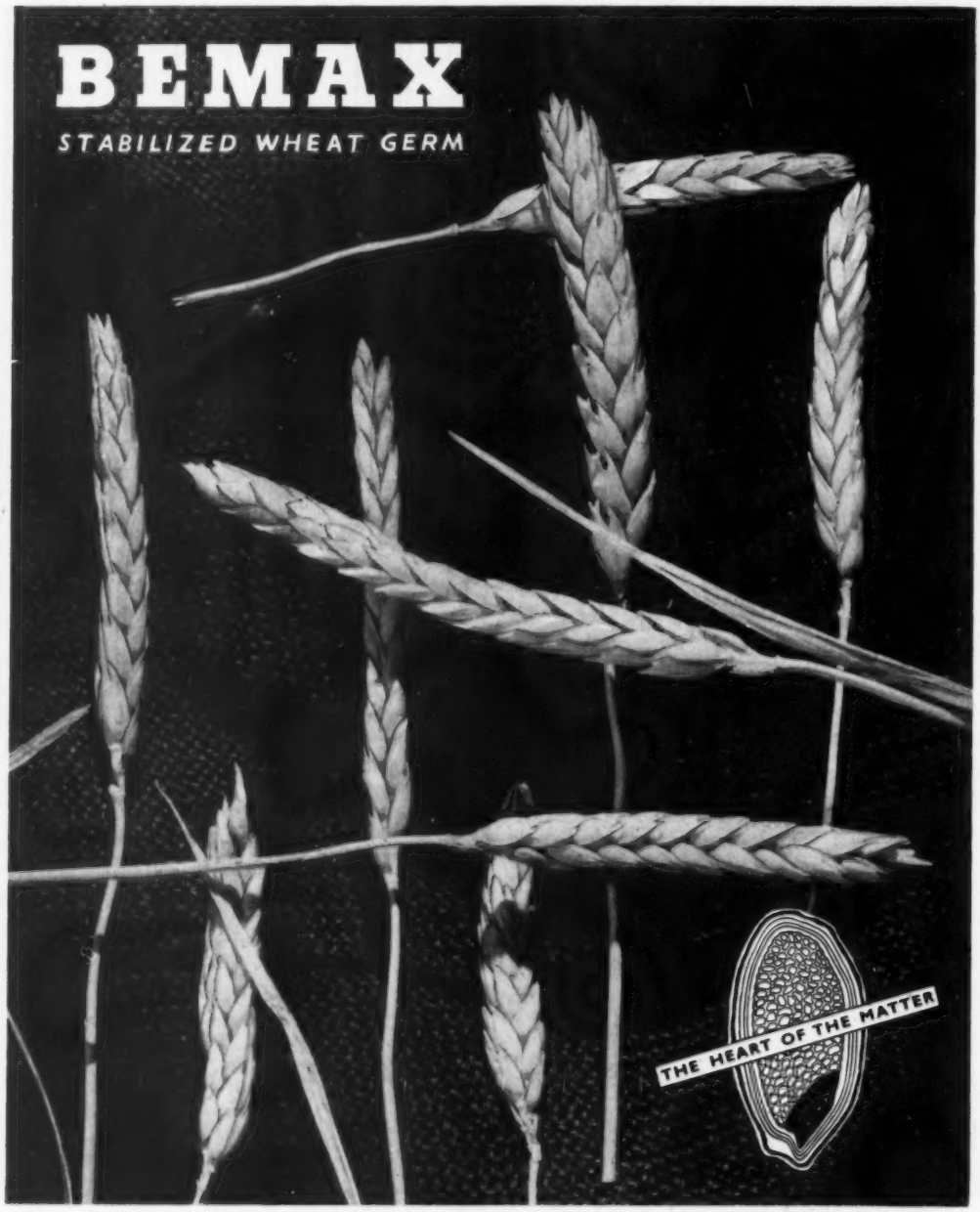

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2 (*The Neutralization of Gastric Acidity with Basic Aluminium Aminoacetate, J. Pharmacol. and Expera Therap. 82:247 (Nov.) 1944.*)

3 (*In Vitro Differences Between Dihydroxy Aluminium Aminoacetate and Dried Aluminium Hydroxide Gel, J. Am. Pharm. Assoc., Sc. Ed. 41:361 (July) 1952.*)

4 (*Effect of Buffering Agents on Absorption of Acetylsalicylic Acid, J. Am. Pharm. Assoc., Sc. Ed. 39:21 (Jan.) 1950.*)

5 (*The Pharmacologic Principles of Medical Practice, ed. 3, Balto., The Williams & Wilkins Company, 1954, p. 593.*)

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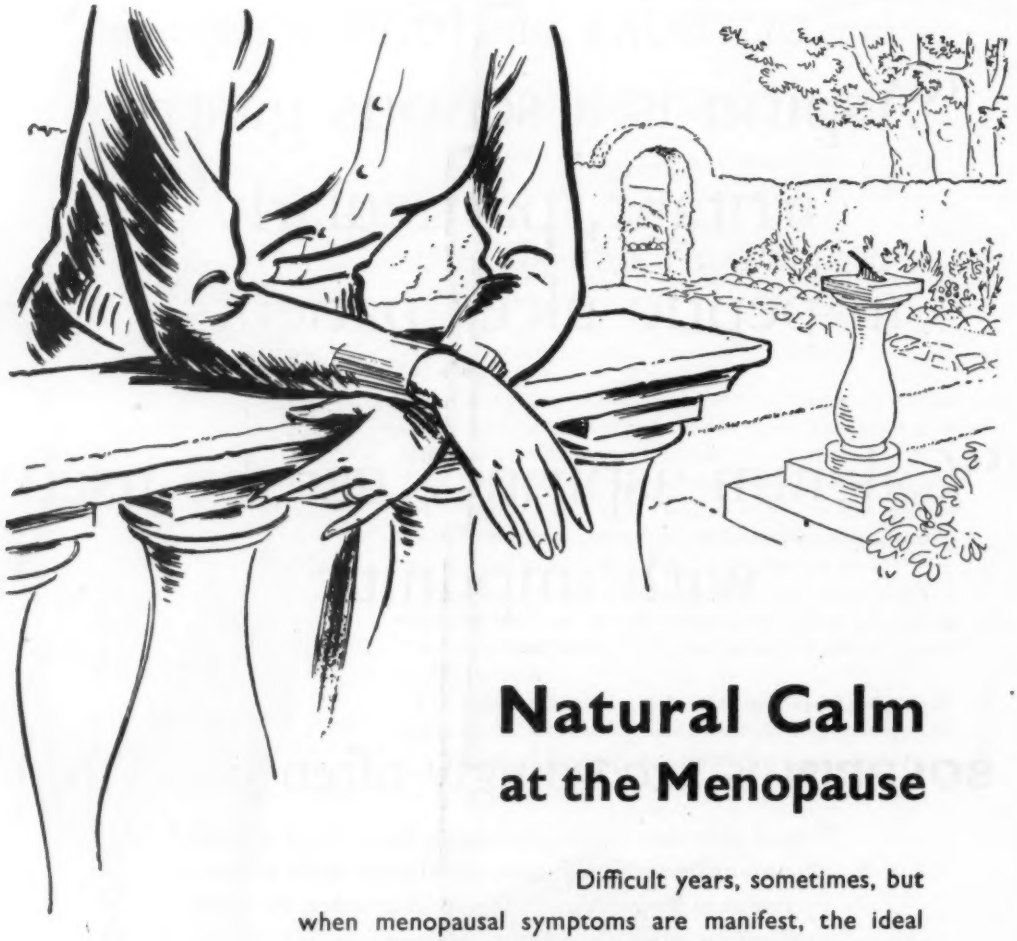

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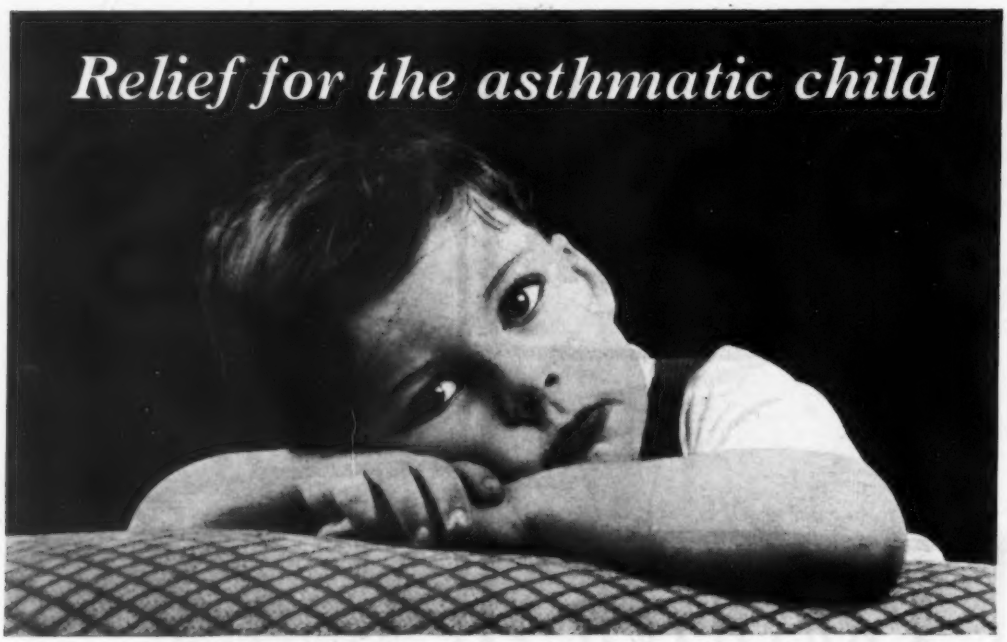

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(1958) *Brit. Med. J.* **1**, 9.

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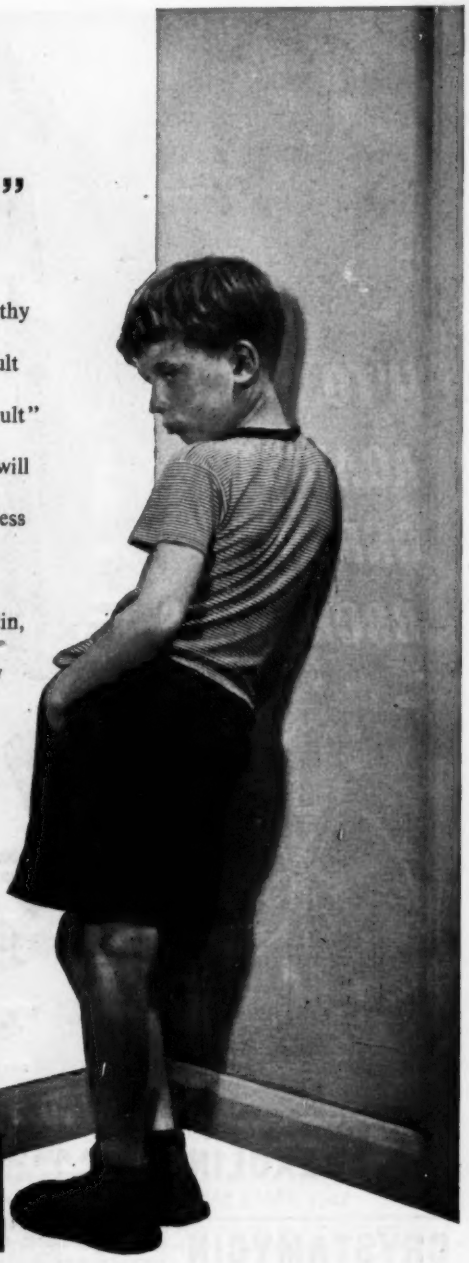

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References: BMJ (1954)11, 1433;
BMJ (1954)1 1038; BMJ (1955)1 1194;
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LANCET (1956)ii 1334

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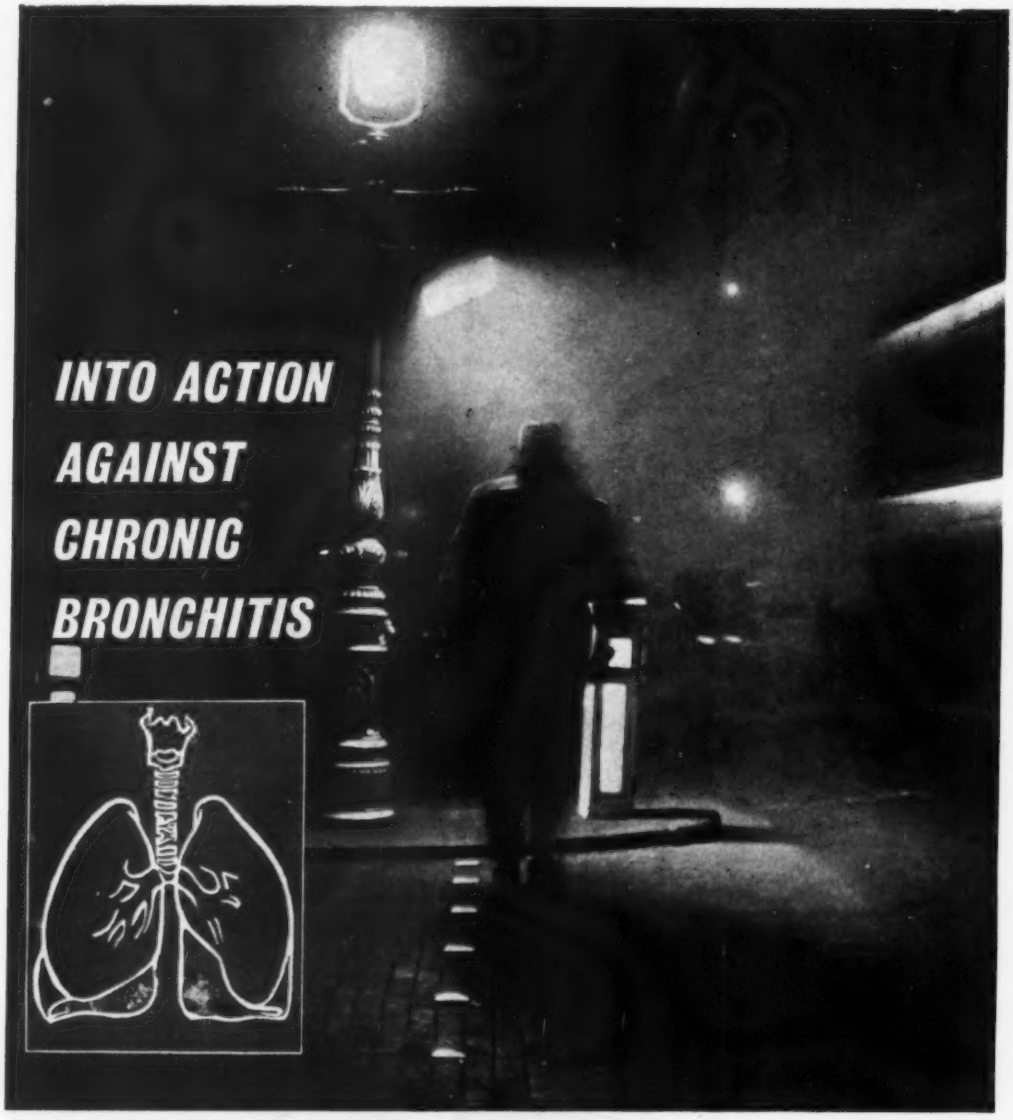

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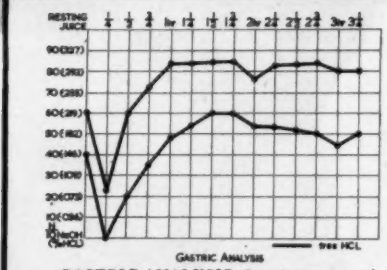
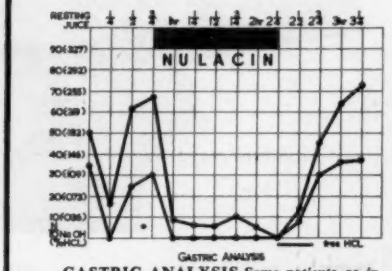


GASTRIC ANALYSIS *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*

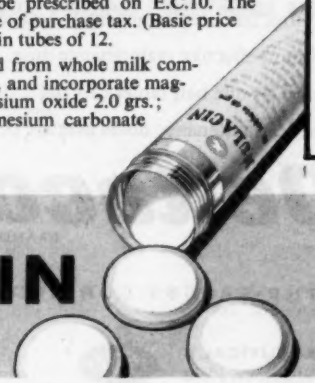


GASTRIC ANALYSIS *Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

BIBLIOGRAPHY

Practitioner, 1957, **178:** 43
Practitioner, 1956, **176:** 103
Amer. J. Gastro. 1956, **26:** 665
Brit. Med. J. 1954, **1:** 46

Further references to the literature and full information on Nulacin available on request.



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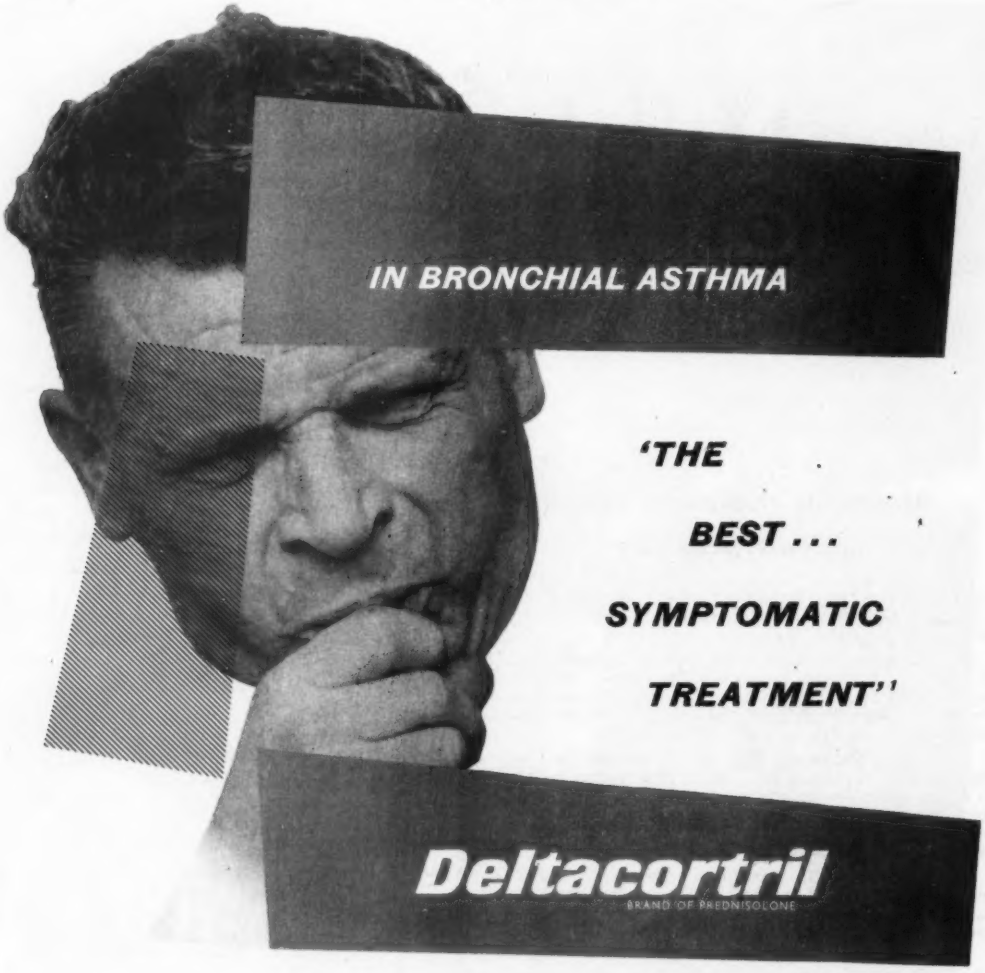

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[1]Schwartz, E. (1956) *N. Y. St. J. Med.*, **56**, 570

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REFERENCES

1. *Brit. Med. J.* (1957) *2* : 67
2. *Ibid.*, page 74

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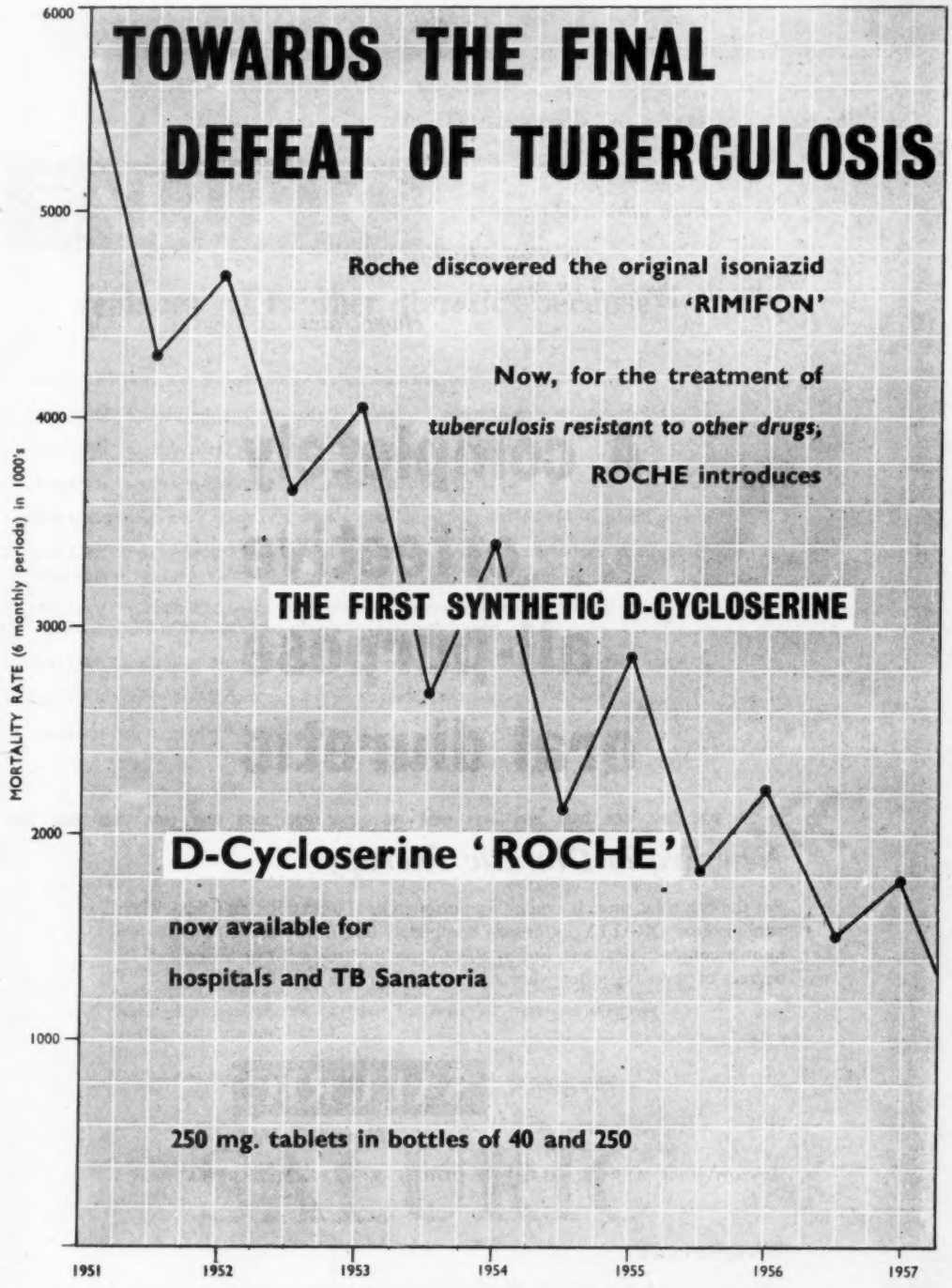

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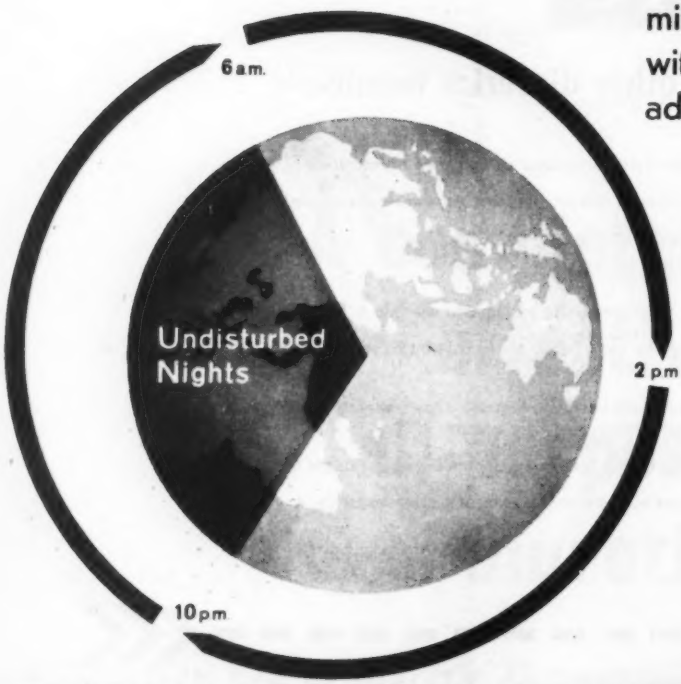

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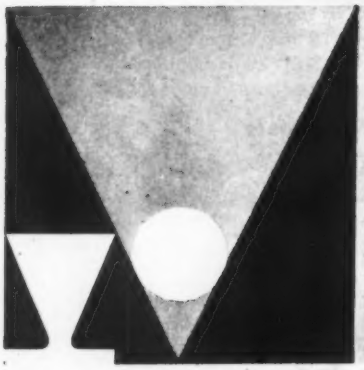

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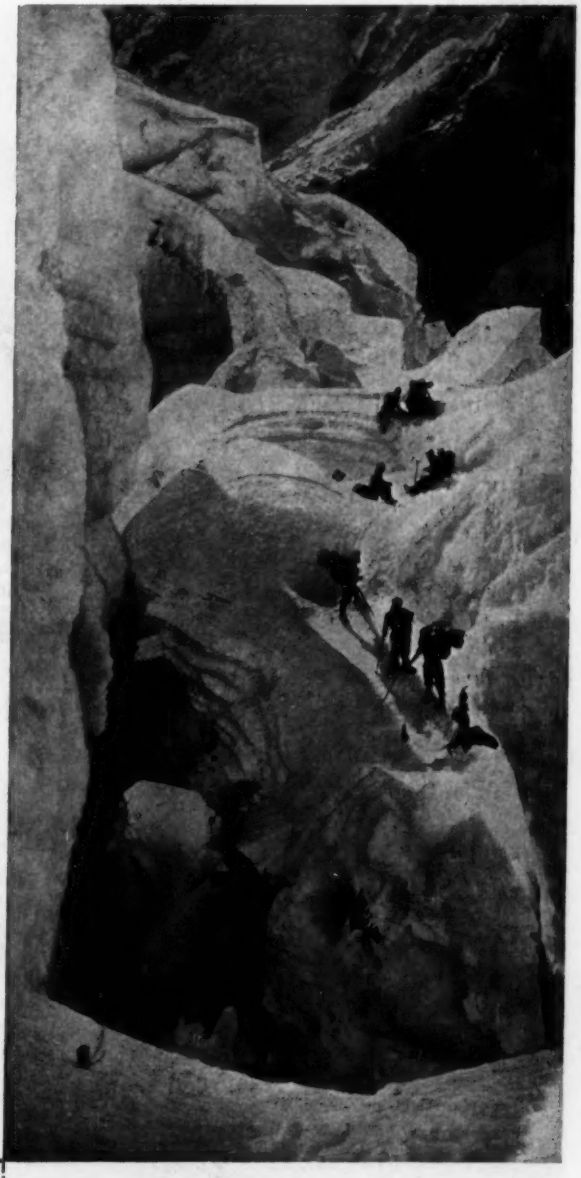

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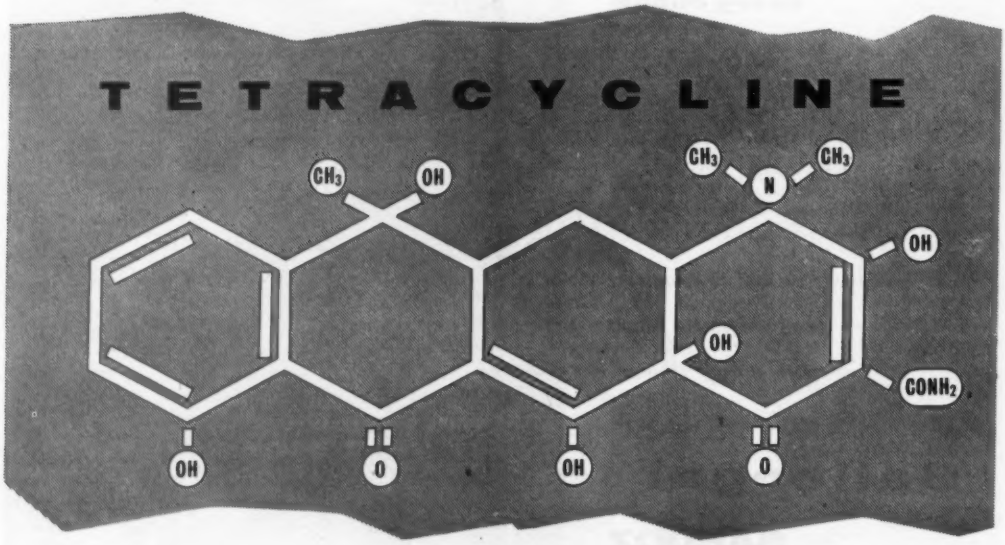

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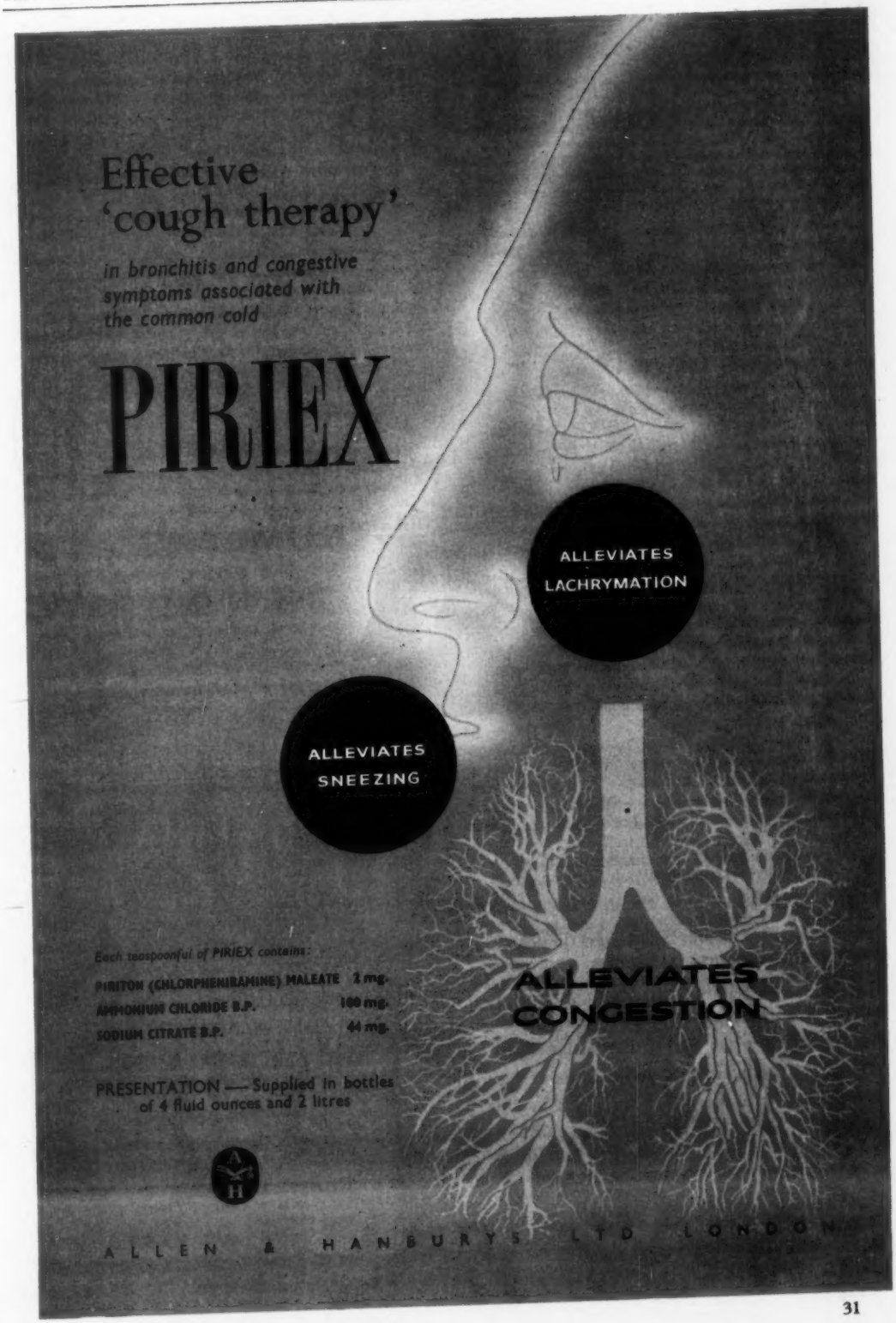
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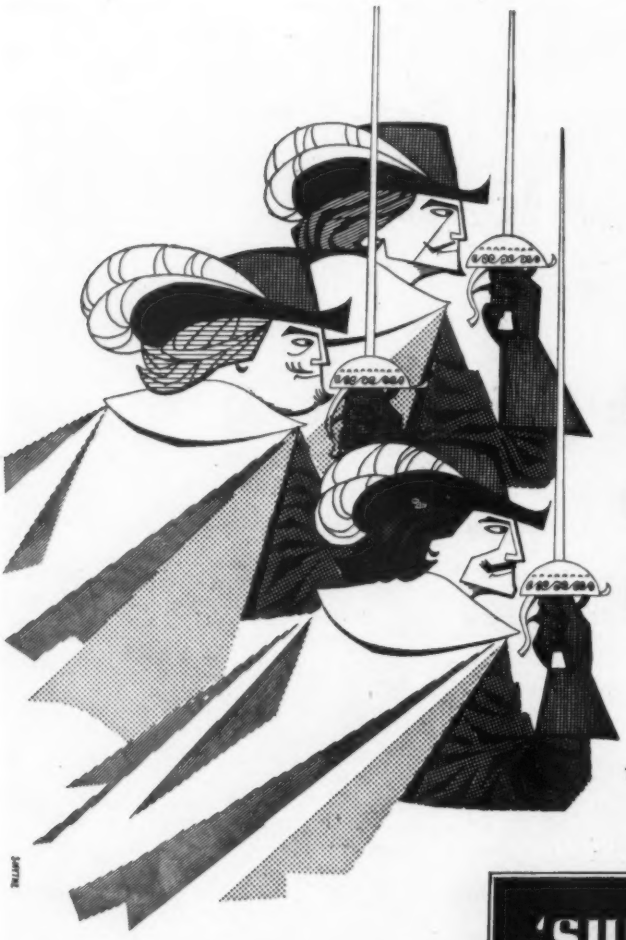

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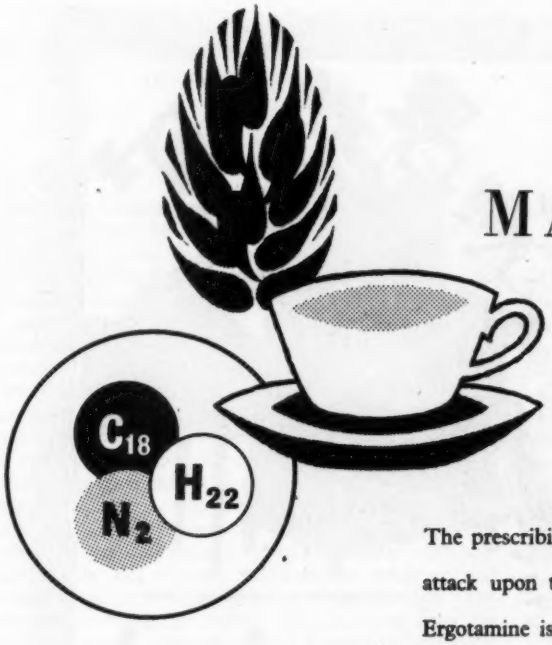

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BETWEEN GUESSWORK AND CERTAINTY IN PSYCHIATRY *

AUBREY LEWIS
M.D. Adelaide, F.R.C.P.
PROFESSOR OF PSYCHIATRY, UNIVERSITY OF LONDON

IT is the common state of reflective and inquiring minds to be somewhere between untrammelled guesswork and certainty. It would be discreditable if psychiatrists were huddled at either extreme, wholly engaged in guessing or ignorantly certain. We are, however, sometimes suspected of luxuriant speculation and of invincible faith in our tenets: and I propose to consider how this reputation has arisen.

More than most branches of medicine, psychiatry can be regarded as an art. One of its distinctive procedures—psychotherapy—manifestly depends on subtle relationships and incommunicable qualities of personality. But in the proportion that it is an art, psychiatry is a weak branch of medicine: and the constant aim of those who would further and strengthen it is to apply to it the methods of scientific inquiry. If these result in encroachments on the area reserved for the art of medicine, and substitute assured knowledge for assumptions and intuitions, so much the better. This is not to deny the large part which compassion and human feeling must play in the care of mental disorder: its history attests that they will always be necessary; but they operate in a territory that must be explored and charted. Psychiatry in this is like the rest of medicine, combining moral and personal principles of action with those arrived at by the methods of science, and depending on the last for any increase in its power to prevent and control disease.

There is a large subcontinent of psychiatric research which is concerned with applying the methods of the natural sciences to morbid phenomena—biochemical and physiological investigations in mental disorder are obviously of this nature. Psychological and sociological inquiries are in another area, that of the social sciences. Many studies in psychiatry lie in both areas—because they are intermediate, as physiological psychology is, or because they are carried out through joint activities. Much controversy has centred on differences between the methods of the natural sciences and of the social sciences, stressing the relative weakness of the latter. Weaknesses in the social sciences—immaturity in their technical procedures, laxity in their theorising—will tell heavily against psychiatric advance. It is true that some psychiatrists distrust the social sciences so much that any excursion in that direction is for them tantamount to walking the plank. Nevertheless the part that psychology and sociology must play in the advancement of psychiatry is undeniable.

Though there is manifest convenience in distinguishing between the natural and the social sciences, fundamental difference between them cannot be discerned. The slower tempo of development in the social sciences, and the immense difficulties in the way of measuring and controlling the phenomena they study, cannot be gainsaid; but the social, like the natural, sciences depend on sense-data, are nourished on hypotheses, and ask to be continually corrected through experiment and enlarged through further observation. If psychiatry were to put all its hopes in the application of the natural sciences and were to claim exemption from the discipline of the social sciences, it would be aligning itself, along a large stretch of its front, with dead philosophies and cults in which doubt is repudiated for the sake of a limited and spurious inner consistency.

* * *

The scientific method, which has been so closely studied of late by philosophers, is not, of course, the preserve of the natural sciences (though to them it owes its enormous prestige). Whether in the physical, the biological, or the social sciences, there is the same essential passage from untested guess to tenable, unfalsified conclusion—which may be, rather loosely, called a confirmed conclusion or a certainty, in the sense in which the circulation of the blood is a certainty. The initial hypothesis is arrived at by divers routes, about which on the whole little is known: deductions from it entail predictions which are put to the test of direct observation or contrived experiment: and when enough evidence in support of the hypothesis has accumulated, it is given provisional acceptance. In time statements are thus arrived at which embrace and order very many facts; these statements have always started as hypotheses, plausible guesses.

It is a commonplace that hypotheses are indispensable for scientific activity; and that hypotheses must be judged by their heuristic as much as by their veridical importance: inadequate or false hypothesis may have value in provoking further observation and experiment. "Even mistaken hypotheses are of use in leading to discoveries", wrote Claude Bernard. "It seems indeed a necessary weakness of our mind to be able to reach truth only across a multitude of errors and obstacles." De Morgan put it in a telling paradox—"Wrong hypotheses, rightly worked, have produced more useful results than unguided observations": the phlogiston theory or the corpuscular theory of light illustrates his point. It is equally a commonplace, however, that hypotheses are an impediment to knowledge when they are so loosely formulated that we cannot deduce their logical consequences and therefore cannot make predictive statements which could be verified or refuted; the systematists of the 18th century exemplified this in medicine. Moreover, it is a poor recommendation in favour of a certain hypothesis to say that it explains all we know; for, as Karl Popper emphasises, it is only by testing it on seemingly contrary instances that we can carry out that determined effort at refutation which is what we really mean when we speak of verifying a hypothesis. Interpretations which explain the phenomena only too readily, lead to a feeling of certainty which closes the mind to further inquiry and makes the believer hostile to any breath of scepticism.

I mention these familiar considerations because they have a direct relevance to some puzzling features in the development of psychiatry. In spite of the sophistication apparent in its literature, psychiatry is in some important respects struggling with problems which beset the physical sciences three hundred years ago. The word "hypothesis" was a bad word in the 17th century.

"Hypotheses non fingo", said Newton. "Hypotheses, whether metaphysical or physical, have no place in science." (Quicquid enim ex phenomenis non deducitur hypothesis

* The Bradshaw lecture for 1957, delivered before the Royal College of Physicians on Nov. 7.

vocanda est; et hypotheses seu metaphysicae seu physicae seu qualitatum occultarum seu mechanicae in philosophia experimentali locum non habent.) Indeed, Newton lost no opportunity to belittle them, as in a letter to Oldenburg in 1672 where he wrote " I do not think it needful to explicate my doctrine (of colours) by any hypotheses at all . . . You see therefore how much it is besides the business in hand to dispute about hypothesis. For which reason I shall now proceed to abstract the difficulties involved in Mr. Hooke's discourse, and without having regard to any hypothesis consider them in general terms."

It is a little odd that the most illustrious scientist whom England has produced should have spurned what men now regard as an essential element in the process of arriving at truth. Surely a semantic misunderstanding. But a widespread one. Let us look at a great medical contemporary of Newton's. Thomas Sydenham wrote, in the Preface to his Observations, that hypotheses should be laid aside, in the study and description of diseases, " for 'tis difficult to give a detail of the errors that spring from hypotheses, whilst writers, misled by these, assign such phenomena for diseases as never existed but in their own brains ", and similarly, in his letter to Dr. Paman, he speaks sharply of the many authors whose " writings are founded upon Hypotheses which are the result of a luxuriant imagination; and the symptoms of diseases (wherein their true history consists) as described by them, appear to be deduced from the same source; and the method of cure, also, is derived from the same fictitious principles, and not from real facts, and thus becomes most destructive to mankind; so full of specious reasoning is every page of the writings of such superficial men, whilst the directions of nature are overlooked."

A hundred years later Pinel was still writing in the same strain, rejecting " toute discussion métaphysique, toute hypothèse sur la nature des fonctions intellectuelles ou affectives, sur leur génération, leur ordre, leur enchaînement réciproque ".

It is plain that in those days hypotheses had a bad name because they connoted speculative propositions, so tenaciously held that conclusions derived from observation were rejected if they conflicted with them. It might be assumed that hypotheses no longer carry this taint. Yet in the introduction to a recent English textbook the authors review the requirements for a scientific approach and then say:

" It is embarrassing that such basic ideas of scientific method should have to be repeated and discussed in a textbook of psychiatry; but not one of these requirements is met by a very large part of the contributions which are made to contemporary psychiatric literature. . . Hypotheses are reared in a vacuum without logical basis, and are expressed in imprecise phraseology in terms which have not been defined. They are often so vague that it is impossible to draw logical consequences, but even when that can be done critical investigations are not made. . . . (Workers') hypotheses serve the single aim of providing a framework for interpretation " (Mayer-Gross, Slater, and Roth 1954).

These strictures echo the complaints from the 17th century: and are voiced, from a more detached standpoint, by a medical historian reviewing the theory of psychoanalysis:

" a ' system ' explaining in logical sequence the origin, nature and treatment of all disorders of a given class is suggestive—within the mental field— ", says Richard Shryock, " of those general medical systems which were so typical of the eighteenth and earlier centuries. If, like the latter, psychoanalysis cannot be checked one way or the other, it represents a reversion to the system-making stage in medical methodology, and may be expected to reproduce the various features and developments typical of that level. It is suggestive that this is indeed just what has happened. Once more, within this particular field, one hears of masters and disciples, of divergent ' schools ', of scientific controversies in which there is an ' attack ' or a ' defence ' of a given system, with more or less feeling on both sides."

A more recent censure, by outspoken psychiatrists, is that of Lemkau and Pasamanick, who, contemplating the preventive powers at our disposal, wrote in 1953:

" The flashes of insight that have characterized the great leaders of our field in the past must be documented painstakingly with proof, a type of scientific discipline of which psychiatrists are perhaps more derogatory than appreciative."

Whether these severe judgments are unfair is less important than that they repeat a pattern of criticism which is neither unfamiliar, nor confined to psychiatry and psychoanalysis. Historians have similar hard things to say about Prof. Arnold Toynbee. Sociologists note such frailties in other sociologists. And in the most entrenched and assured branches of medicine critics sometimes discern them too. As an unsparing observer of loose thinking in medicine noted, the dividing wall between an unconfirmed hypothesis and a valid explanation often disappears, especially in therapeutics, because autistic aims prevail over rational thought (Bleuler 1927). This is nothing new: " the human understanding resembles not a dry light, but admits a tincture of the will and the passions . . . for man always believes more readily that which he prefers . . . his feelings imbue and corrupt his understanding."

* * *

It would be easy to pile up instances showing that psychiatry is not the only branch of medicine—or of knowledge—to be pilloried for lax thinking and complacent dogmatism. It has, however, troubles which seem peculiar to itself, and some ministrants who seem peculiarly indifferent to the scientific method as understood by the rest of the world. Nevertheless, I doubt if these are special characteristics: psychiatry's troubles are those inherent in the study and improvement of human behaviour; psychiatrists are for the most part bent, like other doctors, on doing their best for patients according to current methods and theories, without stopping to pick up and examine the little hedgehogs of doubt that sit by the therapist's path. There is nothing specially psychiatric about that. Besides those undoubting psychiatrists engaged mainly in treatment, there are in many countries psychiatric investigators fully alive to the rigorous demands of research but equally alive to the extreme complexity of their problems.

This complexity can be well seen when the value of treatment is reviewed. It has been said that " psychotherapy is where organic medicine was in the days of Paracelsus ": this gross exaggeration attests the gloom which some feel when they try to judge the present position of psychotherapy, and indeed of psychiatric treatment in general. Has the psychiatrist culpably failed to observe elementary principles of trial and evaluation, or has he attempted the task but found it too formidable? The question is not a rhetorical one. To answer it, the evaluation of psychiatric treatment has to be looked at more closely.

* * *

The aims of medical treatment are ordinarily to remove or lessen disabilities and pain, to put an end to morbid changes in the patient's body of which he may not be aware but which must sooner or later cause disability, and, thirdly, to enable him to live as satisfying a life as possible, in spite of persistent disability and morbid process. Applied to mental illness, all this becomes

equivocal. The patient will often be unaware of disturbances very plain to others; he may not complain of his symptoms; he may even cherish them. He may lead a less satisfying life when his symptoms have been got rid of than when he had them. The morbid process often has no physical substrate that we know of: and the psychopathology may be obscure and inaccessible. The criteria of recovery are therefore hard to specify, and, like the criteria of improvement, depend on an assessment of the patient's happiness, competence, and wellbeing which involves moral and social values as well as plainly medical ones. It must moreover be a comparative assessment, since if the patient was a poor creature—an inadequate psychopath, as people now say—before his attack of anxiety and depression came on, it must be counted as recovery if he reverts to his previous state, free again from manifest anxiety and depression, though in another man, previously better equipped to fulfil his social role, an illness that subsided leaving him in a state of inadequacy and social malaise would be rightly regarded as having a bad outcome.

A rather silly but often repeated truism says that the aim of psychiatric treatment is to promote mental health. It is hard to tell what the latter phrase means. Mental health is an invincibly obscure concept. Those who have attempted to define it in positive terms have twisted ropes of sand, telling us, for example, that a man's mental health consists in

> " (a) active adjustment or attempts at mastery of his environment as distinct both from his inability to adjust and from his indiscriminate adjustment through passive acceptance of environmental conditions; (b) unity of his personality, the maintenance of a stable, internal integration which remains intact notwithstanding the flexibility of behaviour which derives from active adjustment; and (c) ability to perceive correctly the world and himself."

This clutter of words is groping towards an ideal, a sociobiological ideal: but much of it can have no operational referents and it abounds in terms which are undefined and at present undefinable. Most of those who state criteria of mental health follow the lead of the World Health Organisation in refusing to take the absence of disease or infirmity as the characteristic feature; they do not say a man is well when he is free from manifest illness but speak instead of " optimal growth and happiness of the individual ", " full maturity ", " adjustment to the world and to each other with a maximum of effectiveness and happiness ", using quantitative words like " full " and " maximum " to qualify immeasurable states like happiness.

* * *

Mental health, we may conclude, is an abstraction which is very loosely interpreted. We cannot in every case decide, by comparing the degree of mental health after an illness with that before, whether the patient has recovered, or whether his illness has improved, or is stationary, or worse.

It is of course true that in many instances such a difficulty hardly enters anybody's mind, since there is an undeniable change for better or worse in the patient's condition, and everybody entitled to express an opinion—the patient, his relatives and intimates, his doctor—will concur. But these cases are not, I think, the majority. With an illness such as schizophrenia, or still more perhaps with many neurotic disorders, the issue is not clear cut; there may be sharp differences of judgment about outcome. One psychiatrist can report a rich harvest of recoveries in a series of patients whom another, equally sincere and observant, would describe as partial failures of treatment.

This is indeed an obstacle which will persist so long as we have no satisfactory measures of clinical change. There is another, worse obstacle—uncertainty as to what would have happened if the treatment had not been administered. " We cannot judge the influence of a remedy on the course and outcome of a disease if we do not previously know the natural course and outcome of the disease." The course of a mental illness is affected by so many factors, within the patient and in his environment, it is so subject to unforeseen turns of fortune that a change cannot safely be attributed to therapeutic intervention unless it is frequently and regularly produced or comes prompt on the heels of the treatment. This is of course a common difficulty in therapeutics which can be overcome by rigorous trials using, as controls, patients closely comparable to those who are treated. But matching psychiatric groups for this purpose is a daunting business, since they should at least be alike in the distribution of sex, age, intelligence, duration of illness, form and severity of illness, and previous treatment: alike also in the physical, and still more the psychological, circumstances of their medical and nursing care, except for the particular therapeutic procedure that is on trial. It is an exacting affair to match for form and severity patients with illnesses whose somatic pathology is not known and the symptoms of which can be elicited fully only with the patient's concurrence—a requirement often unfulfilled. The therapeutic zeal of psychiatrists, now as great as was once their nihilism, militates also against painstaking trial and provisional judgment of various methods of treatment: a difficulty in other branches of medicine, too.

The delay caused by these impediments is evident in the confused verdict on hypoglycæmic treatment of schizophrenia with insulin. Here is a method that has been before the world for over twenty years, widely employed in all civilised countries, and the subject of hundreds of experiments and technical reports. Yet it is still in such a dubious state that one can read responsible statements declaring on the one hand that it is " the only effective method of treating early schizophrenia " and, on the other, that " there is no significant difference in the outcome of treatment (of schizophrenia) whether unconsciousness has been induced by insulin or by barbiturates". Leucotomy is in rather similar case, and the medley of " tranquillising " drugs may pass, though more rapidly, into the like chiaroscuro of approval and rejection.

* * *

But the doubts which attend physical methods of treatment are dwarfish alongside the giant misgivings and disputes which envelop psychotherapy in dust and fog. The trouble is of long standing, and has divided psychiatrists bitterly. In the Bradshaw lecture of 1936, the psychiatrist who delivered it said:

> " There is practically no evidence in existence as to the efficacy of psychotherapy which is guarded against fallacy in such a way as would entitle it to serious consideration in a court of law. Among those ' cured ' by any novel remedy are those who have never had the disease, those who still have it, those who have never had the treatment, and those who would have recovered equally well without it. All these classes are generously represented among those cured by psychotherapy."

After this pungent and uncompromising passage, Professor Mapother went on to express his qualified belief in the usefulness of psychotherapy:

> " it is time to recognise ", he said, " that the hard-boiled disbeliever in psychotherapy is as dead as Queen Anne. The

real division is between those who are contented and discontented with the fumblings at present enjoying the name. . . . It would be absurd to deny a certain limited efficacy to psychotherapy."

Since then belief in the efficacy of psychotherapy has become much more general among psychiatrists, and valuable systematic observations like those of Whitehorn and Betz have become available. But the same note, with modifications, can be heard in the following passage from a recent paper by two prominent American psychiatrists:

"We do have the firmest kind of conviction that psychotherapy carried on under the aegis of medicine provides . . . a type of help which is of the first order of importance. . . . But while admitting the importance and efficacy of psychotherapy in its many forms, we cannot emphasise too strongly the necessity for being as rigorous as possible when we make scientific judgments about the methods, goals and effectiveness of psychotherapy" (Bowman and Rose 1954).

This attitude, moreover, is found among psychiatrists who are constantly engaged in psychotherapy. Thus a veteran psychoanalyst, C. P. Oberndorf, acknowledged the many obscure aspects and unpredictability of treatment, about which psychoanalysts themselves were not agreed, and urged the need for a planned investigation of the results of psychoanalysis.

The psychiatrists I have referred to—and, I should think, the great majority of psychiatrists everywhere—are convinced that psychotherapy is beneficial. But which patients it will benefit, what changes it will effect, whether one form of psychotherapy is more effective than another and if so for which types of illness—these are questions they ask themselves with varying insistence and frustration, distrusting their personal opinions on a matter of this kind, and distrusting the consensus of their fellow experts equally or more—since they know enough of the history of medicine and of human illusions to be aware that what most people are convinced of at a given time is not necessarily true.

Psychiatrists have not yet succeeded in investigating the efficacy of specified forms of psychological treatment for specified mental disorders in a way which satisfies the customary requirements of scientific evidence.

Besides the reasons I have been mentioning, there is the difficulty of accumulating a sufficient number of treated and untreated patients and of withholding treatment which patients desire and which their doctors think would benefit them. Psychotherapy, in its most widely known form—i.e., psychoanalysis—may go on for years, and is more often than not carried out in private practice. To collect the requisite number of comparable patients entails the cooperation of a number of psychiatrists engaged in psychotherapy and requires that their patients should be willingly available for independent examination at various phases of their treatment.

Psychotherapists are seldom sceptical or, as one might say, ambivalent about the treatment they give, and "philosophic doubt" is not in keeping with their metier; many of them would desist from psychotherapy if they ceased to be sure that it is effective. It is therefore asking a great deal to invite them to cooperate, at this time of day, in trying to find out whether they may be deceiving themselves as to the usefulness of their life's work. In my own experience, it has not proved possible to get groups of psychotherapists committed to an adequate planned investigation into the results of their treatment.

Among the main problems to be solved if such an investigation is to succeed are how to measure mental change and how to predict mental illness. Now the measurement of mental functions is an enterprise to which psychologists have addressed themselves with brilliant success, and the prediction of behaviour on actuarial lines has been developed by psychologists also, as the names of T. R. Sarbin, Philip Vernon, and Paul Meehl remind us. It would be natural therefore for psychiatrists to have prayed in aid of psychologists here for flattening the major obstacles and designing the whole investigation with that scientific detachment which psychologists may be supposed to possess in high degree.

Detachment is not always evident in psychologists when they concern themselves with psychotherapy. Some immerse themselves in it wholeheartedly as practitioners, on the American pattern. Others sedulously contemplate the pretensions of psychotherapy, shudder, and denounce its hollowness; they are drawn to it by a fascination like that which God has for atheists. But even if psychologists are sometimes emotionally involved, just as psychiatrists are, there is no doubt that they can contribute notably to the elucidation of a problem which everyone must wish to see solved. They have in fact tackled it, if C. R. Rogers' "client-centred" counselling is to be reckoned as a form of psychotherapy. Their skills are relevant, and in my view indispensable, if we are to emerge from the existing morass—as indispensable as the skills of the psychiatrist. By emergence from the existing morass I mean not just a warranted conclusion that psychotherapy is or is not effective for such and such conditions—though that would be much—but a discriminating set of unrefuted propositions which would define attainable goals appropriate to categories of illness or of personality, classify forms of psychotherapy in terms that could be applied without ambiguity to the practice of any psychiatrist, and provide a more "objective", more public and uncontaminated analysis of the therapeutic process than any now offered.

These may seem overweening hopes, in the light of what we have had for so long: but, even if they were fulfilled it would still be only an instalment, largely empirical, of what is needed to free psychotherapy from clogging uncertainties. Current methods of psychological treatment are, or seem to be, legion; they doubtless include procedures that can do harm, at any rate in irresponsible hands; and for some of them the connection between theory and practice is tenuous, the connection between what is preached and what is done so remote as to be discreditable. Besides these infirmities, there is of course much strength and much achievement. How could it be otherwise when there are so many psychiatrists of great ability and intellectual integrity, broadly trained, and gifted in handling complex relationships with others, who devote themselves without reservation or misgiving to psychotherapy as their main business in life? It is in no sense derogatory of their work to want psychological treatment put on a firmer basis of confirmation and precision than it now has. A fair-minded and illuminating review of psychotherapy in 1955 included the following declaration:

"In our present ignorance it is practically certain that clients are treated by methods of varying inappropriateness, largely as a function of which therapist they happen to get to. Also it is practically certain that many hours of skilled therapists are being spent with unmodifiable cases, or in the use of techniques which are effective but unnecessarily time-consuming." (Meehl 1955).

This is true, and it has a moral—a moral that can be drawn with special force in a Welfare State like ours, under obligation to provide its citizens with all the approved medical treatment they need. To withhold psychotherapy from any neurotic invalid, or any delin-

quent, or anyone with psychopathic personality—once it had been demonstrated properly that such treatment would lead to recovery or much improvement in these people—would be indefensible. It would be indefensible, within a comprehensive national health service, even if elaborate treatment were shown to be requisite for many patients: practical objections would be raised, of course, on grounds of cost and the availability of doctors, but the issue turns essentially on whether there is convincing evidence of the value of treatment. The United States Department of Health recently published a book on *Evaluation in Mental Health* which listed and abstracted 980 relevant articles. It concluded: "an obvious finding is the thinness of the efforts at evaluation."

Here, then, is a great domain of psychiatric practice in which there has been an excessive proportion of guesswork and rather a lot of subjective certainty. More doubt might have been salutary, for the reason that Bacon stated: "if a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts, he shall end in certainties." The remedy lies in the hands of psychiatrists and psychologists working together. It will demand a considerable effort of reorientation, and indeed sacrifices, from those psychiatrists who devote most of their time to systematic psychotherapy; and from psychologists it will demand an intimate understanding of the conditions of clinical practice and, indeed, some reorientation likewise.

(to be concluded)

LEUKÆMIA AND RELATED CONDITIONS AND THE BLOOD-URIC-ACID

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GOUT develops very rarely in typical myeloid leukæmia and rarely in typical polycythæmia, but not uncommonly in atypical cases of both these diseases, particularly-cases of leukæmia without the very high leucocyte-count (100,000 per c.cm.) in the circulating blood of typical cases, and cases of polycythæmia in which a high leucocyte-count occurs in the circulating blood in addition to the high erythrocyte-count (Hickling 1953). It is in such cases that myeloid metaplasia involving leucoblasts, erythroblasts, and especially megakaryocytes develops.

The association of gout with this type of myeloid metaplasia seems important; and, since a patient may have a high blood-uric-acid level for years without any sign of gout, the present paper is concerned with observations on the blood-uric-acid levels of patients with myeloid metaplasia of the spleen, including some cases of typical myeloid leukæmia, the blood-uric-acid levels being related to the histological changes found in bone-marrow and spleen.

It has been found that there is a very close association between a high blood-uric-acid level and the presence of large numbers of giant cells, closely resembling megakaryocytes, in the bone-marrow and in the tissues affected by myeloid metaplasia. This particular association is the reason why gout is very rare in typical myeloid leukæmia, the cells in the tissues and bone-marrow being chiefly leucoblasts, and why gout occurs more commonly in polycythæmia, in which it has been known for many years that myeloid metaplasia may involve leucoblasts and megakaryocytes in addition to the erythroblasts (Weber 1921).

The relationship between a high blood-uric-acid level and megakaryocyte-like giant cells in the bone-marrow and in the tissues affected by myeloid metaplasia appears to be a reciprocal one, because, when a leukæmia-like disease develops in a patient who has had gout for years, it is an atypical leukæmia, often an "erythroleukæmia", the leucocytes not reaching "leukæmic" numbers, and the tissue changes are those of "megakaryocytic myelosis", sometimes with sclerosis of the bone-marrow in addition to large numbers of megakaryocyte-like giant cells. This is of great importance in considering the ætiology of leukæmia, because very few conditions are known to cause myeloid metaplasia, the essential feature of myeloid leukæmia.

Observations

These statements are based upon observations of the blood-uric-acid levels in 58 patients, who have as common factors massive myeloid splenomegaly, with various associated changes in the circulating blood, the most important of which is the presence of immature leucocytes. The number of leucocytes in the circulating blood and the percentage of immature cells vary very greatly through the series, from the typical cases of myeloid leukæmia, with more than 100,000 per c.mm. and a considerable proportion of immature cells, to the leucopenia, with a very low proportion of immature cells, of a few cases of "megakaryocytic myelosis", polycythæmia, or osteo- or myelo-sclerosis. But the detection of immature red and white cells in the circulating blood is of very great importance in the diagnosis of myeloid splenomegaly, and other signs of this may be basophilia, sometimes very high, and eosinophilia.

The 58 cases may be classified as follows:

13 cases of myeloid leukæmia with typical circulating blood, in 5 of which histological findings are available.

4 cases of myeloid leukæmia in which, before treatment, the leucocytes did not reach "leukæmic" numbers (about 100,000 per c.mm.); histological findings are available in 2 of them.

10 cases of polycythæmia, in 8 of which histological findings are available.

11 cases of osteosclerosis, with distinct radiological changes in the bones, in 10 of which histological findings are available.

11 cases of myelosclerosis, in all of which histological findings are available.

6 cases of "megakaryocytic myelosis," in all of which histological findings are available.

3 cases of chronic non-leukæmic myeloid splenomegaly (Witts 1956), in all of which histological findings are available.

These divisions are made for convenience only, and many cases could be put into other divisions. For example, 1 patient with myeloid leukæmia had considerable megakaryocyte proliferation in the bone-marrow; all the patients with polycythæmia had well-marked megakaryocytic proliferation in the bone-marrow or in the tissues, or in both; 2 of the patients with megakaryocytic myelosis had some very fine sclerosis of the bone-marrow; and several patients with osteosclerosis and with myelosclerosis had considerable megakaryocytic proliferation of the bone-marrow in addition to the sclerotic changes. The relationship between these cases is discussed later.

To save repetition, throughout the paper figures for blood-uric-acid levels indicate the number of milligrammes in 100 ml. of blood, the estimations being made on blood-serum. The term giant cells means giant cells closely resembling megakaryocytes, as these appear in sections of bone-marrow.

MYELOID LEUKÆMIA

Of the 13 patients with typical circulating blood 12 had uric-acid levels of 3·1–6·6 mg. except for short periods at the beginning of X-ray treatment, when levels of 7·0–9·5 mg. were found, the levels later returning to the previous values. 5 patients died of myeloid leukæmia, but no histological findings were available. In 5 cases histological findings were available, and the proliferation of the bone-marrow and the myeloid metaplasia of the tissues was predominantly leucoblastic without conspicuous giant cells. 1 patient had a considerable increase in the reticulin fibres in the bone-marrow together with leucoblastic proliferation. 2 patients are still living, with uric-acid levels of 3·4–5·6 mg.

4 patients in this group did not have typical leukæmic circulating blood. 1 of these had a uric-acid level of 4·0 mg. with typical leucoblastic changes in the bone-marrow and typical leucoblastic myeloid metaplasia of the tissues. 1 had uric-acid levels of 6·7–11·7 mg. (seven estimations in a year) and conspicuous giant cells in the proliferated bone-marrow. The 2 other patients had uric-acid levels of 10·0 mg. and 9·1 mg., but no histological findings are available. None of the patients with myeloid leukæmia had gout.

POLYCYTHÆMIA

Of the 10 cases in this group 4 were seen in an early stage, when spleens were not massive, and when there was no leucocytosis and there were either no or very few immature leucocytes in the circulating blood. The uric-acid level in all at this stage was 2·1–4·9 mg. 1 patient died four years later, but no more uric-acid estimations were made. 1 died nine years later and had many giant cells in a sclerotic bone-marrow and in the myeloid metaplasia of the spleen, but no further uric-acid levels were estimated. In another patient, however, who is still living, the spleen has become much larger, small numbers of immature leucocytes are constantly present in the circulating blood, the blood-uric-acid level has risen to 7·9–12·0 mg., and bone-marrow biopsy shows a great many giant cells, with some very fine sclerosis. The 4th patient, also still living after twelve years' observation, has developed massive splenomegaly, a high leucocytosis (up to 40,000 per c.mm.), and blood-uric-acid levels of 6·6–7·7 mg. No histological findings are yet available.

The remaining 6 patients with polycythæmia were seen when already they had massive splenomegaly, with leucocytosis and immature leucocytes in the circulating blood. The blood-uric-acid levels in all of them were 6·6–13·3 mg., very often above 7·5 mg. 1 patient died seven years after being seen (no histological findings); 1 is still living, in whom bone-marrow biopsy shows a great many giant cells; 1 died after seven years' observation and had a great many giant cells in the bone-marrow, no sclerosis, myeloid metaplasia of the spleen, and very slight myeloid metaplasia of the liver; 1 died after seven years' observation and had a great many giant cells in the bone-marrow, with slight sclerosis in places; 1 died after six years' observation and had a great many giant cells in the bone-marrow; and the last is still living, bone-marrow biopsy showing well-marked giant-cell proliferation, with early sclerosis. 5 of the patients with polycythæmia had gout.

OSTEOSCLEROSIS

Of the 11 patients in this group, 6 had blood-uric-acid levels of 6·6–12·0 mg. constantly, with large numbers of giant cells in the osteomyelosclerotic bone-marrow and large numbers of giant cells in the myeloid metaplasia of the spleen. 1 patient had uric-acid levels of 7·0–10·0 mg. (eight estimations in two years) with no giant cells in the myeloid metaplasia of the liver or of the spleen (the bone-marrow was not examined). 3 patients had blood-uric-acid levels of 4·0–6·0 mg. throughout the period of observation, and there were no conspicuous giant cells in the osteosclerotic bone-marrow or in the myeloid metaplasia of the spleen or of other tissues. 1 had uric-acid levels of 5·4–6·6 mg., but the patient is still alive, and no histological findings are yet available. 4 of the patients with osteosclerosis had gout.

MYELOSCLEROSIS

There are 11 patients in this group. In 5 the uric-acid levels were 6·1–7·7 mg. (five estimations in a year), 5·7–8·3 mg. (four estimations in two years), 7·5–10·7 mg. (nine estimations in three years), 7·0–9·0 mg. (eleven estimations in five years), and 8·0–10·4 mg. (two estimations in four weeks), and all 5 had conspicuous giant cells in the bone-marrow and in the organs affected by myeloid metaplasia. 5 had uric-acid levels of 2·8–5·3 mg. and no giant cells in the bone-marrow or in the organs affected by myeloid metaplasia. 1 patient had uric-acid levels of 2·0–5·8 mg. over a period of six months and then 6·7–7·8 mg. over the next nine months. At necropsy he was found to have a great many giant cells in the bone-marrow, with very fine sclerosis and myeloid metaplasia of the spleen and the liver without conspicuous giant cells. The last patient had myelosclerosis with large numbers of giant cells in the sclerotic bone-marrow associated with the presence of malignant cells from a malignant prostate in the bone-marrow. He had myeloid metaplasia of the liver and the spleen. His blood-uric-acid levels were 5·1–9·6 mg. over a period of two years. 2 of the patients with myelosclerosis had gout.

MEGAKARYOCYTIC MYELOSIS

There are 6 patients in this group; 3 had gout, 2 after the splenomegaly and other features had been recognised, and 1 started to get attacks of gout twelve years before the splenomegaly was recognised. 1 patient had uric-acid levels of 6·4–11·4 mg. (twenty-one estimations in thirteen years); 1 had 12·5–16 mg. over three months; and 1 had 7·8–11·2 mg. (four estimations in a year). All 3 had a great many giant cells in the bone-marrow; 2 had localised masses of myeloid metaplasia in the spleen containing very large numbers of giant cells. In another patient the uric-acid levels were 5·5–8·6 mg. over five months, and he had large numbers of giant cells in the bone-marrow, with very fine sclerosis. The remaining 2 patients were exceptions: in 1 the uric-acid level was 7·0 mg. or higher only five times out of nineteen estimations in six years, but the bone-marrow showed a great many giant cells with doubtful early sclerosis, with myeloid metaplasia of the spleen; and in 1 other patient there was a single estimation of blood-uric-acid (4·5 mg.), and bone-marrow biopsy two years later showed large numbers of giant cells with early sclerosis.

CHRONIC NON-LEUKÆMIC MYELOID SPLENOMEGALY

3 cases are placed in this group because, though they had massive myeloid splenomegaly, the bone-marrow was normal, being neither hyperplastic nor sclerotic. All died of weakness and wasting. None had any prominent giant-cell proliferation in the myeloid metaplasia of the spleen or the liver. 1, observed for seven years, had blood-uric-acid levels of 2·7–6·3 mg. (eight estimations); 1, observed for two months, a uric-acid level of 5·7 mg.; and 1, observed for three years, had uric-acid levels of 4·9, 6·7, and 8·0 mg.

Throughout the study occasional blood-urea estimations were made (which were always found to be normal) to ensure that raised blood-uric-acid levels were not part of a general retention of nitrogen.

Discussion

With few exceptions the blood-uric-acid levels of patients with myeloid leukæmia and related conditions, without conspicuous giant cells in the bone-marrow or in the organs affected by myeloid metaplasia, were between 2·1 and 6·6 mg. and of patients with conspicuous giant cells, also with few exceptions, between 6·6 and 12·0 mg. These observations suggest that blood-uric-acid levels in myeloid splenomegaly are an important guide to the type of myeloid metaplasia present, and may enable a gradual change in the type of histological change in the bone-marrow and organs affected by myeloid metaplasia to be recognised.

A study of cases of myeloid splenomegaly, some of them for many years, suggests certain conclusions.

Probably as a result of a metabolic disorder, bone-marrow cells proliferate and blood-cells are formed in the spleen and elsewhere. This earliest stage is very rarely seen because it is usually symptomless; but it may occasionally be found in routine examinations, when slight enlargement of the spleen and increase in red cells, white cells, and platelets and slight basophilia in the circulating blood are found; or this stage may be found in the investigation of abnormal hæmorrhage—e.g., into the tissues—or in the investigation of gout. There is no information about whether ordinary cases of myeloid leukæmia pass through such a stage, because the known histology of that disorder is the histology revealed at necropsy; but the fact that a few patients with myeloid leukæmia have a raised blood-uric-acid level suggests that there may be a stage of general blood-cell proliferation before the mainly leucoblastic proliferation is established. When first seen, most patients have already massive splenomegaly and 100,000 leucocytes or more per c.mm. in the circulating blood, suggesting that the disorder has been long established before symptoms are sufficiently severe to cause the patient to seek advice.

The first stage, of general proliferation of bone-marrow cells and myeloid metaplasia of the spleen, may be followed by a stage of chiefly red-cell proliferation, when the symptoms and signs of polycythæmia may be produced, and by a stage of chiefly megakaryocyte proliferation, and this by a stage with increasing reticulin proliferation, followed by marrow sclerosis and then by calcification and osteosclerosis. The blood-uric-acid level is a guide in tracing these stages, because megakaryocytes in large numbers may persist into the myelosclerotic and osteosclerotic stages or they may be obliterated. It is doubtful if myelosclerosis and osteosclerosis occur without a preceding stage with megakaryocyte proliferation. Each of these stages may last many years; and there is no correlation between the underlying pathological state of the bone-marrow and myeloid metaplasia and the clinical and hæmatological features, and this has caused much confusion. The best-known types are the chronic cases of megakaryocytic myelosis, myelosclerosis, and osteosclerosis: the patients live for years with little interference with their general health, the commonest symptoms being those due to the splenomegaly, and death is ultimately due to weakness, wasting, and anæmia. But acute and subacute cases occur in all three stages. The acute cases have a course exactly similar to that of acute leukæmia, the patient having pyrexia, severe anæmia, and hæmorrhages and dying in a few weeks or months. Even patients with very dense osteosclerosis or myelosclerosis, which probably took many years to develop, may have no symptoms until they manifest an acute illness exactly like acute leukæmia. There were 3 acute cases in this series: 1 of early myelosclerosis, 1 of dense advanced myelosclerosis, and 1 of dense osteosclerosis. Several acute cases have been described (Assmann 1907, Firket and Campos 1922). Subacute cases are those which are seen because of anæmia and weakness, and the patients remain weak and ill throughout the period of observation, unaffected by treatment except temporarily by blood-transfusion. There were 6 subacute cases in this series, all of which presented various degrees of osteosclerosis or myelosclerosis, some with and some without conspicuous giant cells among the fibrous tissue. Several subacute cases have been described (Wood and Andrews 1949).

Just as there is no correlation between the type of histological change in bone-marrow and spleen and the clinical condition of the patient, there is also no correlation with the state of the circulating blood. In a patient with megakaryocytic myelosis, myelosclerosis, or osteosclerosis the numbers of red cells, leucocytes, and platelets may be high, normal, or low, there being very great variations from case to case, and the blood picture may change greatly under observation. The great variations in the circulating blood and in the histological picture have been well described (Hutt et al. 1953, Richmond and Duncan 1956, Korst et al. 1956).

Korst et al. (1956) found raised blood-uric-acid levels in 6 of their 23 patients with "myelofibrosis" but did not correlate this finding with histological changes. A patient with anæmia may develop polycythæmia (Hutt and Richardson 1950), a patient with polycythæmia may develop "leucoerythroblastic anæmia" (Stone and Woodman 1938), a patient with "leucoerythroblastic anæmia" may develop polycythæmia (Schwarz 1939), a patient with "leukæmic" blood may develop polycythæmia (Major and Weber 1943), and patients may have a blood picture both "leukæmic" and "polycythæmic" (McAlpin 1929, Klumpp and Hertig 1932, Meulengracht and Petri 1932).

6 patients had gout for years before splenomegaly was first discovered because of abdominal symptoms or during the investigation of weakness, cramps in the legs at night, or gout. The intervals between the first attack of gout and the discovery of splenomegaly in these 6 cases were three, six, seven, ten, twelve, and forty-one years. Only 1 patient was seen before the discovery of splenomegaly: gout started in 1929, and he was seen in 1930 because of a large hæmorrhage from the bowel, but the spleen was not felt then; abdominal symptoms, leading to the discovery of a large spleen, developed in 1936. 3 of these 6 patients are in the polycythæmia group, 2 in the myelosclerosis group (one very early sclerosis, the other advanced sclerosis), and 1 in the megakaryocytic myelosis group. 5 had very large numbers of giant cells in the bone-marrow, and 1 very large numbers in the spleen, with dense bone-marrow sclerosis.

If the numbers of leucocytes in the circulating blood in the chronic cases are considerably increased—e.g., 30,000 per c.mm.—a good response to X-irradiation of the spleen or to busulphan by mouth may be obtained regardless of the type of underlying histology. The spleen becomes smaller, the weakness improves, and cramps in the legs disappear. Good response to X-ray treatment was obtained in 3 cases of polycythæmia, 3 cases of osteosclerosis, 2 cases of myelosclerosis, and 1 case of megakaryocytic myelosis, and to busulphan in 5 cases, all of which had been treated with at least one course of X rays. As with ordinary leukæmia, the effect of treatment lasts a variable length of time, and subsequent courses of treatment tend to have diminishingly good results. As opposed to ordinary leukæmia, most patients with a chronic illness die of weakness, wasting, and anæmia, and sometimes chronic gout, without an acute "leukæmic" termination. Only 1 chronic case in the series, with dense osteosclerosis, presented a terminal blood picture like that of an ordinary case of myeloid leukæmia with very large numbers of myeloblasts.

In only 2 instances in this series was there very evident phagocytosis by the giant cells. There was no correlation between large numbers of giant cells in the tissues and large numbers of platelets in the circulating blood. Almost always, however, giant platelets were found, and in most cases a few megakaryocytes were, at times, found in the circulating blood. These may occur, however, in typical

cases of myeloid leukæmia (Minot 1922). For example, in the cases of polycythæmia, platelets in the circulating blood were found to be very numerous in only 3 cases, and in the cases of megakaryocytic myelosis they were only very numerous constantly in 1 patient, being normal in number in the others. In the cases of osteosclerosis and myelosclerosis in which large numbers of giant cells were present in the tissues, though the platelets in the circulating blood varied from time to time they were mostly normal or somewhat fewer than usual.

The giant cells were studied (Goldschmid and Isaac 1922), and the conclusion was reached that they are phagocytic and also formed platelets. Needle-puncture aspiration of bone-marrow is an unsatisfactory method of examination in this type of case. The megakaryocytes seem to be very fragile and often appear in groups; so they may miss being aspirated in any particular puncture. This has been repeatedly proved in the present series, where only on very few occasions were large numbers of megakaryocytes present in a bone-marrow aspirate, though biopsy showed conspicuous giant-cell proliferation.

Summary

An account is given of the blood-uric-acid levels of 58 patients with myeloid splenomegaly—17 with myeloid leukæmia, 10 with polycythæmia, and the remaining 31 with myeloid splenomegaly associated with osteosclerosis, myelosclerosis, megakaryocytic myelosis, and similar conditions.

A high blood-uric-acid level was very closely associated with the presence of large numbers of megakaryocyte-like giant cells in the bone-marrow and spleen.

Blood-uric acid levels may be used as a guide to the type of myeloid metaplasia present, and the gradual change between some of the conditions mentioned above —e.g., from polycythæmia to megakaryocytic myelosis, and from megakaryocytic myelosis to myelosclerosis— may be followed by determining the blood-uric-acid levels.

When a leukæmia-like disorder appears in a patient who has had gout for years, the histological changes in the bone-marrow and spleen are those of megakaryocytic myelosis.

Prof. J. Patterson and his chief assistant Dr. J. Swale, of Charing Cross Hospital Medical School, were responsible for practically every blood-uric-acid estimation. Most of the patients on whom these observations were made were under my own care at Charing Cross Hospital. Dr. E. C. Warner, Dr. N. S. Plummer, Dr. P. B. S. Fowler, of Charing Cross Hospital, Sir Alun Rowlands, and Dr. John Ellis, of the London Hospital, and Dr. W. A. Bourne and Dr. E. C. B. Keat, of the Royal Sussex County Hospital, Brighton, kindly allowed me to study cases under their care. I am most grateful to all for their help.

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SALT IN PREGNANCY

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IN pregnant rats the appetite for sodium chloride increases more than the appetite for calcium (Richter and Barelare 1938). In 1945, on the suggestion of Prof. F. G. Young, and under the auspices of the Medical Research Council, the effect of salt on the cramps of pregnancy in women was investigated in St. Thomas's Hospital, London. The results were published by Robinson (1947). The conclusion was that salt cured the cramps of pregnancy in a large percentage of cases, and that there was little risk of producing toxæmia of pregnancy by giving salt to cure the cramps of pregnancy.

At a later date 915 pregnant women with cramps were treated, and there was no greater incidence of toxæmia among them than among 2690 untreated women attending the antenatal clinics during the same period. It was found, however, that most of the patients who complained of severe cramp also disliked salt. This dislike of salt made it difficult to persuade all of them to take enough additional salt to cure their cramps.

It was decided that it would be better to prevent the cramps, if possible, by getting women to take more salt early in pregnancy; but before doing this it was essential to find out whether extra salt in the diet of pregnant women did or did not increase the incidence of toxæmia of pregnancy. The present investigation was begun on Aug. 14, 1954, and the last patient was delivered in April, 1957.

Method

Alternate patients, on their first examination at the clinics, were put into groups S and S—. Group S were advised to take more salt in their diet—to use more salt in cooking, to add extra salt to their food at table, and to eat salt bacon, salt fish, and salted nuts, butter, &c. Group S— were told to take less salt in their diet—to use as little salt as possible in cooking, to refrain from adding salt to their food at table, and to eat smoked bacon, unsalted butter, and unsalted fish, &c. Otherwise the diets and other advice were the same in both groups. At each visit their weight, blood-pressure, and urine tests were recorded, and they were reminded about their intake of salt according to their group. Patients with a history of toxæmia were not excluded.

Patients were considered to have toxæmia if their blood-pressure rose above 140/90 mm. Hg with or without other symptoms. They were also considered to have toxæmia if they had œdema and albuminuria without a rise in blood-pressure.

At the first sign of toxæmia patients who had not booked a general practitioner were sent to hospital, where they were seen by an obstetrician who knew nothing of the patients' intake of salt. He confirmed the diagnosis and admitted the patient to hospital for treatment. On admission the intake of salt was stopped. The liaison between the hospitals and the local-authority clinics is so close that it was possible for the investigator to follow the case-notes of each patient through to the end of the puerperium.

All patients booked by general practitioners were sent home to bed. The midwife in charge of the patient informed the general practitioner of what had been found and visited the patient at home about three times a week. She kept a record of the patient's progress, and these

TABLE I—AGE OF PATIENTS

Group	Age (yr.)				
	0–20	21–30	31–40	40–50	Total
S	67	653	281	18	1019
S−	60	643	273	24	1000

records were given to the investigator at the end of the puerperium.

As soon as the first 200 women had been delivered, the number of toxæmias in both groups were assessed. There were 8 in group S, and 12 in group S−. Each group contained 100 women. It was decided that it was safe to continue the investigation.

Results

The investigation started in August, 1954. By August, 1956, 2077 patients had begun treatment, and the last delivery was in April, 1957.

Of these, 1039 had been told to take more salt. 7 of them left the borough before delivery, 10 miscarried, and 3 were later found not to be pregnant. Therefore 20 cases had to be discarded, leaving 1019 completed cases.

TABLE II—PARITY OF PATIENTS

Group	Parity			
	0	1–3	4 or more	Total
S	144	720	155	1019
S−	146	695	159	1000

1038 other women had been told to take less salt. 10 of them left the borough before delivery, 22 miscarried, and 6 were found later not to be pregnant. Therefore 38 had to be discarded, leaving 1000 completed cases.

The women in both groups were more or less similar in age (table I), parity (table II), and time of first attendance at the clinics (table III).

There were 38 cases of toxæmia in the 1019 patients in group S and 97 in the 1000 patients in group S−. The number of toxæmias is shown in relation to parity in table IV and to the mother's age in table V. The toxæmias were fewer in group S at all ages and parities. Table VI shows the toxæmias in detail in both groups. One patient in group S− had gross œdema of legs, hands, face, and abdomen, with headaches and vomiting.

All the other patients who had had œdema were then collected, those with varicose veins being discarded. The numbers of cases with œdema alone were 163 in group S,

TABLE III—DATES OF FIRST ATTENDANCE

Group	First attendance at (wks.)			
	0–20	21–30	31–40	Total
S	531	384	104	1019
S−	518	346	136	1000

and 287 in group S−. Œdema of the legs alone was present in 121 patients in group S and 206 patients in group S−. Œdema of the hands, abdomen, and legs was present in 42 patients in group S and 81 patients in group S−.

Table VII shows the numbers of patients in both groups who had had toxæmia in a previous pregnancy, together with details of those who developed toxæmia again in their present pregnancy. In group S there were 40 such patients, of whom 5 again developed toxæmia; and in group S− there were 39 such patients, of whom 13 again developed toxæmia.

All the other abnormal conditions present in both groups are shown in table VIII. The incidence of œdema, perinatal deaths, antepartum hæmorrhage, and bleeding during pregnancy was lower in group S than in group S−. Whereas the incidence of postpartum hæmorrhage, prematurity, deformities, and breech delivery was almost the same in both groups. 2 of the 17 cases of antepartum hæmorrhage in group S were due to placenta prævia, and 15 were diagnosed as accidental hæmorrhage by the obstetricians in the hospital. 4 of the 32 cases in group S−

TABLE IV—TOXÆMIA IN RELATION TO PARITY

—	Parity			
	0	1–3	4 or more	Total
Group S :				
Patients ..	144	720	155	1019
Toxæmias ..	16	18	4	38
Group S− :				
Patients ..	146	695	159	1000
Toxæmias ..	38	51	8	97

were due to placenta prævia, and 28 were diagnosed as accidental hæmorrhage by the obstetricians in hospital.

The numbers of premature births in both groups were almost the same, and the range of birthweights was similar. However, the maturity by dates was not the same, because 21 infants were born at less than thirty-four weeks, with 13 perinatal deaths, in group S−, and only 11 infants at less than thirty-four weeks, with 4 perinatal deaths, in group S.

Table IX shows the stillbirths in detail. The deformities were anencephalus, hydrocephalus and spina bifida, exomphalos, and fœtus papyraceus. The perinatal deaths are the stillbirths plus the deaths of infants in the first week of life ; they were fewer in group S than in group

TABLE V—TOXÆMIA IN RELATION TO MOTHER'S AGE

—	Mother's age (yr.)				
	0–20	21–30	31–40	41–50	Total
Group S :					
Patients ..	67	653	281	18	1019
Toxæmias	4	20	12	2	38
Group S− :					
Patients ..	60*	643	273	24	1000
Toxæmias	10	54	28	5	97

S−. The neonatal deaths are deaths in the first twenty-eight days after birth; they are given in detail in table X. The neonatal deaths were fewer in group S than in group S−. The greatest difference lay in the respiratory syndrome, which was variously described in the necropsy reports as atelectasis, vernix membrane, hæmorrhagic pneumonia, and cold injury.

During part of the investigation the placentas were weighed in 348 consecutive labours. 176 placentas came from group S and 172 from group S−. Twins were born to 6 women in group S and to 2 in group S−. The twin placentas were discarded, leaving 170 placentas of single infants in each group. The mean placental weight was 21·48 oz. in group S and 20·90 oz. in group S−. Placental infarcts were found in 13 placentas in group S and in 32 placentas in group S−.

TABLE VI—DETAILS OF TOXÆMIAS

Group	No.	Raised B.P.	Alb.	Raised B.P. Alb.	Raised B.P. Œdema	Alb. Œdema	Raised B.P. Alb. Œdema	Severe œdema
S	38	9	0	4	9	0	16	0
S−	97	13	1	7	37	1	37	1

The mean weekly gain of weight was assessed in 844 patients who had attended the clinics regularly from less than twenty weeks' pregnancy to more than thirty-six weeks' pregnancy. There were 422 cases in group S and 422 in group S−. The mean weekly gain of weight was 0·95 lb. in group S and 0·99 lb. in group S−.

In group S− some patients complained of severe backache, some of irritation of the skin of arms, legs, or abdomen, and some of weariness and stiffness in the limbs. Others complained of falling because their legs

TABLE VII—PREVIOUS TOXÆMIAS

Group	No.	Recurrence	Raised B.P.	Alb.	Raised B.P. Alb.	Raised B.P. Œdema	Alb. Œdema	Raised B.P. Alb. Œdema
S	40	5	0	0	1	1	0	3
S−	39	13	2	1	1	5	0	4

suddenly gave way under them. Sometimes this was so severe that they were afraid of going out of their houses or of crossing the road, in case they fell. These symptoms did not develop in group S, and if they were present at the first examination they disappeared as soon as the women took more salt.

Of all the cases diagnosed as toxæmia and sent to hospital only 2 were rejected as not being toxæmia. The diagnosis of all the cases in group S− was confirmed by the hospital, and the patients were admitted for treatment. The 2 cases rejected as not being toxæmia were in group S.

The 1st case to be rejected was in a patient with a raised blood-pressure and no other symptoms of toxæmia. She

TABLE VIII—TOXÆMIAS AND OTHER ABNORMALITIES OF PREGNANCY

Group	No.	Toxæmia	Perinatal deaths	A.P.H.	Antenatal bleeding	Œdema	P.P.H.	Premature births	Breech deliveries	Forceps deliveries	Cæsarean sections	Deformities
S	1019	38	27	17	27	163	47	86	23	22	9	25
S−	1000	97	50	32	50	287	50	89	29	19	14	22

returned to the local-authority clinic and was encouraged to take still more salt, because it was thought that this would be sure to bring out her latent toxæmia. A week later her blood-pressure had fallen to normal, and it remained down for the rest of her pregnancy. No other symptoms of toxæmia developed, even though she kept up her increased intake of salt to the end.

After this case, all women, in both groups, with only a raised blood-pressure were watched for a week before being sent to hospital. All such women in group S− had, by the end of the week, developed other signs of toxæmia and had to be sent to hospital, where the diagnosis was confirmed and they were admitted for treatment. However, in group S, there were 4 women whose blood-pressure had dropped at the end of a week, no other signs of toxæmia developing. They remained well throughout the remainder of their pregnancies.

Meanwhile the 2nd case had been rejected by the hospital as not being a case of toxæmia:

She had raised blood-pressure and albuminuria. When seen at the local-authority clinic, she had been told to take still more salt in her food and to report at the hospital clinic almost a week later. When she reported, her blood-pressure was normal and her urine clear. She returned to the local-authority clinic and was advised to continue on her larger intake of salt.

TABLE IX—STILLBIRTHS

Group	No.	Grossly deformed	Apparently normal	Macerated	Fresh	Infarcted placentæ
S	20	7	13	4	9	4
S−	31	4	27	12	15	7

She did so and remained well throughout the rest of her pregnancy.

It was then realised that these transitory symptoms of toxæmia developed only in group S, and not at all in group S−. It was thought that these symptoms might probably be due to the effect of the extra salt in the diet of these patients. Since the symptoms were only transitory, it was decided that, in future, all women showing signs of toxæmia in group S would be told to take still more salt, and to report each week at the local-authority clinics. In 11 cases the symptoms disappeared and never recurred throughout the remainder of the pregnancies. Of these 11 patients 8 had raised blood-pressure and œdema, 2 had raised blood-pressure, albuminuria, and œdema, and 1 had albuminuria and œdema.

TABLE X—NEONATAL DEATHS

Group	No.	Deformities	Cerebral hæmorrhage	Respiratory syndrome	Fibrocystic disease
S	8	3	1	4	0
S−	21	4	2	14	1

When the investigation had ended and the data had been collected, the question arose: what were these cases with transitory symptoms of toxæmia? Were they toxæmias which had spontaneously recovered, or were they not toxæmias at all? No similar cases had occurred in group S−. Since it had been ultimately found that the incidence of toxæmia was much lower in group S than in group S−, it was difficult to believe that the extra salt in the diet had been the cause. It was decided that, in future, women with toxæmia of pregnancy should be treated with extra salt in their diet. Then it would be

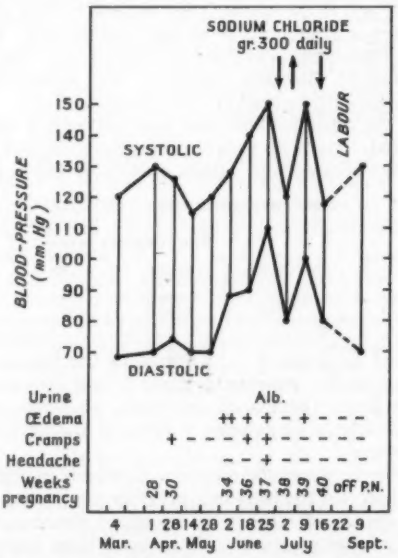

Fig. 1—When salt was reduced (as indicated by the upward-pointing arrow) symptoms recurred. They disappeared when salt was again increased. (P.N. = postnatal.)

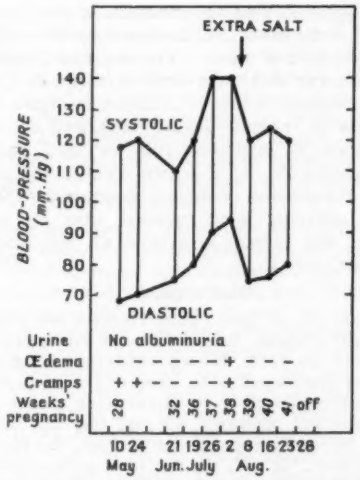

Fig. 2—A mild case of toxæmia which cleared up completely.

seen whether the symptoms disappeared or became worse.

There were 28 women with toxæmia of pregnancy between the end of May and the end of September, 1957. 8 of them had booked general practitioners and were not given extra salt but were referred, as usual, to their general practitioners, who either treated them at home or sent them to hospital. These toxæmias followed the normal course and showed no sign of spontaneous recovery before delivery. The other 20 patients had not booked a general practitioner and were advised to take extra salt. This was their only treatment; they were not put to bed or told to rest; nor were they given sedatives.

The 1st patient developed toxæmia at thirty-seven weeks' pregnancy. She took more salt by adding as much salt as possible to her food. Her symptoms had all disappeared in a week, and being better she spontaneously took less salt. Next week her symptoms recurred. She again took more salt and was again better in a week. She then continued on her increased intake of salt until the end of her pregnancy and had no further symptoms of toxæmia (fig. 1). This patient's weight again increased just before her blood-pressure rose, and returned to normal when she took more salt.

The 2nd patient disliked salt and was put on six pills of sodium chloride a day. Each pill contained gr. 5; so she was taking gr. 30 of sodium chloride daily. Her blood-pressure never settled; it dropped to normal each afternoon and rose again every morning. Her headache disappeared in twelve hours and never returned. Her œdema went in four days and reappeared a few days later in her legs for a day. Eight days after the onset of her toxæmia she was delivered of a normal full-time infant.

A 3rd patient, who disliked salt, was put on twelve gr. 5 pills of sodium chloride a day. All her symptoms disappeared, but her blood-pressure never fell below 140/90 mm. Hg, and on several days she had slight œdema of the legs only. This patient and the 2nd patient were the only ones who had infarcted placentas.

The remaining 16 patients were advised to measure out each morning four heaped teaspoonfuls of table salt and to see that by night they had taken all of it. It was calculated that they took about gr. 200–300 of sodium chloride daily. The larger the amount taken the quicker was the recovery. They found it easiest to take the bulk of this salt in orange-juice, lemonade, or lime-juice, the remainder being put on their food. They were visited daily until all symptoms had disappeared. All of them recovered completely and continued well on at least three heaped teaspoonfuls of table salt a day. None of them had an infarcted placenta, and all gave birth to live full-term infants.

In a 4th patient toxæmia developed about the thirtieth week of pregnancy. She is 5-para with no history of previous toxæmia. The blood-pressure rose first at the eighteenth week, and she was advised to take more salt. At her next visit, her blood-pressure had dropped to normal; so she spontaneously cut off her extra salt. This was not discovered until toxæmia developed at the twenty-ninth week. She was then told to take three heaped large teaspoonfuls a day and recovered. Her husband and two children developed influenza; and she was so busy nursing them and running the house that she had no time to measure out her daily salt. As a result her blood-pressure again rose, but she had no recurrence of symptoms. She was told that she could work as hard as she liked, provided she took four heaped teaspoonfuls of salt daily. She again recovered, and was delivered, at forty-two weeks, of a living infant weighing 8 lb. 6 oz., who cried lustily. Macroscopically the placenta showed a few tiny patches of infarction round its edges.

It was later found that large quantities of table salt often made the patients vomit. Nausea and vomiting disappeared when they changed over to rock salt, but rock salt is more difficult to measure.

It therefore appears that the 17 cases in group S were true toxæmias which recovered spontaneously because still more salt had been consumed after the symptoms had developed.

Conclusion

Extra salt in the diet seems to be essential for the health of a pregnant woman, her fœtus, and the placenta.

Summary

2077 pregnant women were investigated. 1039 were told to take more salt and 1038 to take less salt.

There was a lower incidence of toxæmia, œdema, perinatal death, antepartum hæmorrhage, and bleeding during pregnancy in those told to take more salt. Other conditions were about the same in both groups. Of those told to take extra salt 17 had transitory symptoms of toxæmia.

20 women with early toxæmia were then treated with extra salt. All of them improved, and the larger the dose of salt taken the quicker and more complete was the recovery. The extra dose of salt had to be taken up to the time of delivery; otherwise the symptoms of toxæmia recurred. Only early cases of toxæmia were available for treatment.

My thanks are due to the Derby borough district midwives for their help in this investigation.

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"... Civil aviation enjoys a phenomenal safety record in comparison with that of the automobile, it being approximately forty times safer to fly on a scheduled airliner than to travel a like distance by auto. But this wide variation would not exist if reasonable consideration had been given in earlier years to crash-safety design in automobiles. If all automobiles were equipped with safety belts—and people wore them—adequate door locks to keep the occupants from cracking their skulls on the pavement, and delethalized interiors, the difference in the 'safety ratio' between airline and automobile travel would be reduced by at least one-half."—A. HOWARD HASBROOK, *J. Aviat. Med.* 1957, **28**, 541.

A DISEASE, PROBABLY HEREDITARY, CHARACTERISED BY SEVERE MENTAL DEFICIENCY AND A CONSTANT GROSS ABNORMALITY OF AMINOACID METABOLISM

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THERE is no need to stress the problems posed by the large numbers of mentally defective people, and by our few present hopes of fully corrective therapy. A milestone in the modern development of our knowledge occurred with the discovery of the specific hereditary form of mental deficiency called phenylketonuria (Fölling 1934), especially because of its association with a comparatively simple disorder of phenylalanine metabolism—simple, that is, when compared with the complexity of the biochemistry in other hereditary forms of mental deficiency such as Tay-Sachs disease, or gargoylism. Since that time further discoveries have been made of more simple biochemical disorders in various forms of mental deficiency and in closely related neurological or medical conditions: for instance, galactosæmia (reviewed by Holzel et al. 1957), Wilson's disease (reviewed by Bearn 1957), the so-called "organic aciduria" syndrome (Lowe et al. 1952, Dent and Harris 1956), and recently of H-disease (Baron et al. 1956), and of goitrous cretinism (reviewed by Stanbury and McGirr 1957).

In each of these instances compounds of well-known chemical structure are involved. Since something is already known about their metabolism, one can immediately speculate about possible forms of therapy and, in some cases—e.g., phenylketonuria and Wilson's disease—begin seemingly rational therapeutic trials. A further point of interest is the fact that the biochemical disorder, when known, may be so gross, easy to detect, and constantly present as to remove any difficulty in diagnosis.

It also seems to be of especial significance that all the disorders mentioned above are hereditary. Clearly there are likely to be many more such diseases which have so far escaped recognition; but with the development of paper chromatography, by which body fluids can easily be scanned for the presence of abnormal quantities of hundreds of known or likely metabolites, we can reasonably expect many important discoveries to be made in the near future.

We describe here preliminary studies of a further disease of this type. These studies began in October, 1955, when a girl apparently suffering from idiopathic epilepsy was admitted under one of us (J. D. A.). Her subsequent progress did not conform to the usual pattern of such epilepsy. After the cessation of the convulsive period, and in the absence of further convulsive episodes, she exhibited general ataxia. This unusual feature, with the fact that the child was severely mentally retarded, and our subsequent failure to establish an organic neurological cause or systemic disease, suggested a metabolic disorder such as hypercalcæmia or lead poisoning. Chromatography (V. K. W.) then revealed the presence of a gross abnormality of urinary aminoacids. Study of the girl's relations later revealed that an identical abnormality was present in a male sib who also has a severe mental defect.

Case-reports

Case 1.—A girl, M., aged 3 years 5 months, was admitted to Stepping Hill Hospital, Stockport, as an emergency on the evening of Oct. 29, 1955. She was conscious but not cooperative and was considered to be recovering from convulsions. She had been quite well up to mid-morning of that day, but between then and admission she had had five convulsive seizures of increasing severity and duration, the last shortly before admission. In each she had been unconscious, but in none had she been incontinent. From the description it appeared that there had been symmetrical generalised clonic movements of face, arms, and legs. The first attack had lasted 2 or 3 minutes, and the last 15–20 minutes. There was nothing to suggest a precipitating cause, she was apyrexial, and there was no history of injury.

General examination, apart from a moderately loud (grade-3) musical systolic murmur, maximal along the left sternal border, was negative. Examination of the nervous system revealed no abnormality except that the Babinski reflex on each side was equivocal.

Treatment and progress.—She was placed on routine sedation (phenobarbitone), the provisional diagnosis being idiopathic epilepsy. During the night she had one further convulsion, of a generalised epileptiform type, lasting a few minutes. In the morning she seemed brighter. She continued apyrexial but had developed purulent rhinorrhœa, and her fauces were thought to be injected. Prophylactic parenteral penicillin was given and continued for the next five days. The plantar response after admission became flexor bilaterally. Four days after admission (Nov. 2, 1955) at short intervals (1 hour) during the morning there were three further similar convulsions. The patient was then still apyrexial. There were no more convulsions thereafter during her stay in hospital (discharged Dec. 9, 1955). During this time she was maintained on phenobarbitone, and she was discharged on prophylactic doses. On Nov. 16, 1955, she had pyrexia (100·5° F) for the first time ; it lasted 5 days, the highest recorded temperature being 102·4°F and was considered to be due to an *Escherichia coli* pyelitis and was treated with sulphadiazine.

Mental condition.—Though, for a day or two after admission, we had been inclined to attribute her failure to speak and cooperate in general to a combination of her new environment and the effect of the epileptiform seizures, we realised at this time that she had a severe degree of mental retardation. On the sixth day after admission (Nov. 4, 1955) she had severe ataxia (she had had three convulsions on Nov. 2, 1955). Ataxia was first seen in her arms, being particularly noticeable during attempts to pick up a cup and feed herself. The degree of incoordination was such that she could not complete these simple movements and had to be fed ; but she had no difficulty in swallowing and no choking. There was no apparent anomaly of any cranial nerve, in particular no nystagmus. The incoordination resembled that of a severe chorea, with a suggestion of an athetoid overlay, and occurred only on voluntary action. Both arms were equally affected. We could not examine the coordination of her legs other than to establish that she could not stand or walk. Tone was normal. From this day on, there was a steady, quite rapid, and general diminution in the degree of incoordination. By Nov. 15, 1955, she could coordinate fairly well : she could feed herself and walk. Her

walking, however, was still unsteady ; she staggered and fell easily but did not stagger or fall in any particular direction. She seemed to walk on rather a wide base. At the time of discharge there was no real evidence of any ataxia. Her coordination in general was slower and less harmonious than normal for her age but could be accepted as not incompatible with the degree of her mental impairment. Owing to the degree of mental impairment it had been impossible to apply adequately any finer test to ascertain or define the individual component factors in her incoordination.

Previous history.—The patient had been born at full term by normal delivery at home. There were no complications at birth. The neonatal period was uneventful. She was artificially fed and in the first few months had a moderate amount of vomiting, which led to a trial of many different brands of dried milk. She was eventually given sterilised cow's milk and from then on had no more vomiting. In spite of the vomiting she had steadily gained weight. Her mother described her as a " lovely bonny happy baby " and did not consider that there had been any delay in smiling, sitting up, or walking (sat up at 8 months and walked at 11 months), but she felt quite early that the patient was backward like her brother (case 2), but only in speech. She had measles and chickenpox at the age of 1 year (case 2 and other sibs had the same illnesses at this time). Each illness was mild, and there were no unusual symptoms or complications. She had a period of about a week's duration of convulsions in January, 1955. The convulsions were very slight (" just in and out " in her mother's words). They were symmetrical and generalised and occurred once or twice a day. Her doctor (Dr. J. Edwards) prescribed sedation. Hospital advice was not sought. There was no known precipitating factor, and the child was apparently apyrexial throughout. For about 2 weeks after this the mother noticed that the patient was unsteady in her hand movements. She did not think that there was any unsteadiness in walking or that the patient walked less well than before this 14-day period. Thereafter until the time of her admission to hospital (Oct. 29, 1955) her mother had not considered that there was any abnormality of coordination; but after her discharge on Dec. 8, 1955, her mother noticed that the patient walked unsteadily and fell easily. She said that the child walked " sort of sideways ", and that sometimes, even when standing, " her legs would just give way and down she would go ". She did not notice any incoordination of the patient's upper limbs.

Investigation and reports.—The blood findings are given in table I. The urine appeared normal on routine examination; no phenylpyruvic acid was found. Mantoux negative. White-cell count normal with normal differential. Blood-film normal, no punctate basophilia. Throat swab no pathogens. Lumbar puncture on Nov. 3 and 22, 1955, clear fluid; pressure normal, cells less than 1 per c.mm., protein 20 mg. per 100 ml. Radiography of long bones, skull, and chest normal. Urinary lead not abnormal. Finally, on chromatography an unusual urinary aminoacid was found by one of us (V. K. W.) and was further studied at University College Hospital.

TABLE I—BIOCHEMICAL FINDINGS IN SERUM (OR PLASMA) OF AFFECTED SIBS

—	Case 1			Case 2	
	Admission no.				
	1	2	3	1	2
W.R. and Kahn	Neg.	Neg.	..	Neg.	..
Urea (mg. per 100 m.)	30.0	27·0	21·0	32·0	24·0
Calcium (mg. per 100 ml.)	11·7	10·7	10·4	10·6	9·5
Sodium (mEq. per litre)	..	137·0	144·0	139.0	148·0
Potassium (mEq. per litre)	..	5·1	4·1	4·1	4·1
Cholesterol (mg. per 100 ml.)	..	210·0	160·0	190·0	170·0
Phosphate (mg. per 100 ml.)	..	5·8	4·8	5·7	4·8
Chloride (mEq. per litre)	..	100·0	103·0	101·0	108·0
Bicarbonate (mEq. per litre)	..	21·0	15·2	21·8	24·9
Total protein (g. per 100 ml.)	..	6·0	..	6·2	..
Albumin (g. per 100 ml.)	..	3·7	..	3·9	..
Globulin (g. per 100 ml.)	..	2·3	..	2·3	..
Electrophoresis (paper strip)	..	Normal	..	Normal	..
Alkaline phosphatase (K.-A. units)	..	27·0	28·5	23·0	24·5
Magnesium (mg. per 100 ml.)	..	2·8	..	2·3	..
Fasting blood-sugar (mg. per 100 ml.)	..	75·0	..	75·0	..

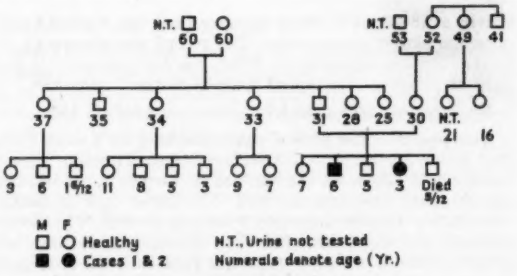

N.T.
60 60
N.T.
53 52 49 41
37 35 34 33 31 28 25 30 N.T.
21 16
9 6 1 6/12 11 8 5 3 9 7 7 6 5 3 Died 3/12
M F
Healthy
Cases 1 & 2
N.T., Urine not tested
Numerals denote age (Yr.)

Fig. 1—Family tree.

Patient's family.—In view of the possibility that an inborn error of metabolism was responsible for the patient's disorder, her whole family were investigated, especially as regards their urinary output of aminoacids. This was done thoroughly with the help of Dr. H. Harris. The pedigree is shown in fig. 1. The near relations were then interviewed. The father was a healthy lorry driver of average intelligence; the mother was a healthy woman of intelligence above average. Their children consisted of (1) V., a healthy intelligent girl aged 7 years; (2) K. (case 2), a boy aged 6 years, who was healthy but attended a school for backward children; (3) C., a healthy intelligent boy aged 5 years; (4) M., and (5) D., a boy who died of bronchopneumonia at the age of $4^1/_2$ months. The parents were not consanguineous. There was no history of abortions or miscarriages. The first four sibs were born at home and appeared normal at birth. The fifth child was given an exchange transfusion at the age of 4 hours for Rh (D) incompatibility. After this he had cerebral manifestations in the presence of fairly deep jaundice but made an apparently satisfactory recovery. A female cousin, aged 11 years, had had fits in infancy, but we have not seen or examined this child. Otherwise there was no ascertainable history of mental defect, neurological disease, fits, or other possibly relevant factor in the family. In view, however, of the mental defect in the second sib, K., and since his urinary aminoacid chromatogram showed a gross aminoaciduria abnormality identical with that already found in M., arrangements were made to admit both affected sibs to West Park Hospital, Macclesfield, for further study.

Readmission.—M. was admitted on Feb. 15, 1956. Since Dec. 8, 1955, she had remained well. The phenobarbitone had been discontinued a month before readmission, but there had been no further convulsions. There was no ataxia. Biochemical findings are shown in table I. Intravenous pyelography showed that both kidneys excreted the dye normally. No lesion of the urinary tract was found. Blood picture normal. Red-cell fragility normal. Coombs test negative. Urine normal on routine examination. van den Bergh no direct reaction. Bilirubin less than 0·5 mg. per 100 ml. Thymol turbidity 3 units. Thymol flocculation +. Cerebrospinal fluid (C.S.F.) clear, colourless, and containing no cells, sugar 75 mg. per 100 ml., chlorides 770 mg. per 100 ml., and protein 10 mg. per 100 ml. Pandy negative. Lange gold showed no change.

Electrocardiography.—On Nov. 29, 1956, Dr. A. Hollman reported: " Semi-vertical heart with ST depression in V4, aVL, and I, and T-wave inversion in V7, aVF, and III. R/S rate of 0·30 in lead V1 is rather low but is borderline normal for age. The changes are consistent with left ventricular hypertrophy."

Electroencephalography.—The resting record showed spasmodic bursts of medium-voltage alpha rhytham at 8 c/s in the occipital and preoccipital areas, bilaterally synchronous and symmetrical. The dominant rhythm was of medium-voltage theta activity at 4–6 c/s seen in all areas, symmetrical, and bilaterally synchronous. There were occasional diffuse bursts of high-voltage delta activity at $3^1/_2$–4 c/s, which were symmetrical and predominantly out of phase on the right. Low-voltage beta

activity at 18–22 c/s underlay the record and was superimposed upon the slower components. The record was abnormal. It showed cerebral dysrhythmia, which was predominantly in the right hemisphere. No typical epileptic features were seen.

Discharge.—The patient left hospital on Aug. 10, 1956.

Readmission.—The patient was readmitted for a week from Jan. 17 to 24, 1957, to University College Hospital. Since her previous admission she had had no further fits and in her general health had remained well. No further signs of disease were noted. The cardiac murmur was still present. The blood-pressure was 95/70 mm. Hg. The biochemical findings are given in table I. Routine urine and renal-function tests gave normal results. Skeletal radiographs were normal.

Case 2.—M.'s elder brother K., aged 6 years 3 months, was admitted on Feb. 15, to West Park Hospital and discharged on Aug. 10, 1956. He had been born at full term by normal delivery at home. There were no complications at birth. The neonatal period was uneventful. He was fed on dried milk and throve well but was never an eager feeder. He smiled at 5 months, sat up at 7 months, and walked at 13 months. His mother did not consider that he was backward in anything except speech. This delay in speaking she attributed to deafness, but she had him examined at the age of $2^1/_2$ years at Manchester Royal Infirmary by Professor Ewing, who excluded any auditory abnormality. From then she had accepted the patient as backward. He had never had any fits, and his only previous illnesses had been measles and chickenpox at the age of 4 years at the same time as case 1 and their sibs. These illnesses were mild and uncomplicated. He had sustained one accident: at the age of 4 years 9 months he was knocked down by a car, was not unconscious, and sustained only minor injuries. He was treated at home. His mother said that he had never had any unsteadiness like M. but " seemed to keep his legs a bit bent at the knees and to take quicker and quicker steps as he went forward, often ending in falling forward ".

Examination.—General examination was negative except that, like M., he had a moderate (grade-3) musical systolic murmur maximal along the left sternal border. The continuing severe mental retardation was noted. It was also observed, as in case 1, that the hair was abnormal (see below).

Investigations.—Biochemical findings are given in table I. Skeletal radiography, screen of heart, and intravenous pyelography normal. Full blood-count normal. Red-cell fragility and Coombs test normal. Routine examination of urine normal. van den Bergh no direct reaction. Serum-bilirubin less than 0·5 mg. per 100 ml. Thymol turbidity 2 units. Thymol flocculation negative. C.S.F. clear and colourless, containing no cells, sugar 75 mg. per 100 ml., chloride 750 mg. per 100 ml., and protein 10 mg. per 100 ml. Pandy negative. Lange gold test normal.

Electrocardiography.—On Nov. 29, 1956, Dr. Hollman reported: " There is a dominant R in V1 with an R/S ratio of between 1·7 and 2·5, which is definitely abnormal at this age and consistent with right ventricular hypertrophy. There is also slight ST depression in aVL, which may indicate left ventricular involvement. The QTC is prolonged at 0·440."

Electroencephalography.—The resting record shows spasmodic bursts of high-voltage alpha rhythm at 8 c/s in the occipital areas. There were occasional bursts of low-voltage or medium-voltage beta activity at 18–20 c/s in all areas. High voltage theta activity was the dominant rhythm at 4–6 c/s in all areas. Associated with this were occasional high-voltage spikes, which are out of phase throughout the right hemisphere. There were numerous bursts of diffuse high-voltage spike and wave activity at 3–$3^1/_2$ c/s. They were symmetrical and consistently out of phase on the right. The record was abnormal. There was definite evidence of epilepsy dominating the right hemisphere, with occasional spread to the left.

Readmission.—The patient was readmitted for a week from Jan. 17 to Jan. 24, 1957, to University College Hospital. Since his previous admission he had had no fits and had been in good general health. No further signs of disease were noted. The cardiac murmur was still present. The blood-pressure was 110/70 mm. Hg. His hair had grown a little better and required occasional cutting. The biochemical findings are given in table I. Routine urine and renal-function tests gave normal results. Skeletal radiographs were normal.

a *b*

Fig. 2—The affected sibs: *a*, case 1 (M.); *b*, case 2 (K.).

Further Observations on the Two Affected Sibs

Facial Appearance

The affected sibs bore a striking resemblance to each other (fig. 2). Their expression also was the same, being sad and wistful.

Hair

Their hair was light brown, dry, and friable. Its growth seemed to be irregular, giving a tufted, almost matted, appearance. It was difficult to comb or brush into any semblance of tidiness. The ends were frayed and they seemed to break off abnormally easily, particularly over the occipital region, presumably owing to its being the area of greatest friction.

Their mother had noticed that their hair was not like that of the other two living sibs. She described it as " different—goes very brittle—comes out on the comb and leaves a stubble ". She thought the " coming out " was particularly noticeable in November and December. She stated, however, that K. had " beautiful curly " hair until the age of 15 months, and that case 1's hair also was normal in infancy. The hair of the father, mother, and the other two living sibs was normal (for colour of hair see below).

Skin

M.'s skin was slightly rough on the arms and on the dorsum of the hands but elsewhere normal. The texture of case 2's skin was normal. In both children perspiration appeared to be normal. Except that case 2 had an area of pigmentation near the lower half of his right sternomastoid muscle and as large as a silver threepenny piece, there were no other lesions (xanthomatous, vascular, pigmentary, or other) in either child. The teeth and nails were normal. Lacrimation and salivation were normal. Case 1's eyes were grey and case 2's light brown.

Electroencephalography and Neurology

In both children the electroencephalograms were grossly abnormal (see above). Case 2, whose electroencephalograms showed definite evidence of epilepsy, had no clinical manifestations, whereas case 1, in whose electroencephalograms " no typical epileptic features were seen ", had epileptiform seizures. We are indebted to Dr. C. E. Smyth for the electroencephalograms and for his further neurological opinion as follows: " So far as I am concerned, I could find no evidence of gross cerebral disease in either of them. They are, of course, backward. There is no evidence of any motor disturbance, and I thought their fundi were normal. There were no superficial anomalies of the skin and no enlargement of liver and spleen. I cannot really throw further light on this problem."

TABLE II—BLOOD-GROUPS

Father	Mother	Case 2	Case 1	Brother	Sister
O R_1r MNs P–ve Le(a+b–) Lu(a–) kk Fy(a+) Jk(a+)	O rr MNs P–ve Le(a–b–) Lu(a–) K+ve Fy(a+) Jk(a+)	O R_1r MNs P–ve Le(a–b–) Lu(a–) K+ve Fy(a+) Jk(a+)	O R_1r MNs P–ve Le(a–b–) Lu(a–) K+ve Fy(a+) Jk(a+)	O rr MNs P–ve Le(a–b–) Lu(a–) kk Fy(a+) Jk(a+)	O rr MNs P–ve Le(a+b–) Lu(a–) kk Fy(a+) Jk(a+)

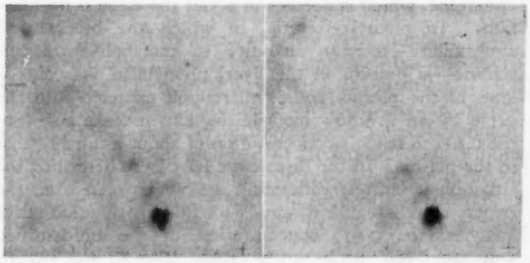
Our final opinion of coordination in these two children was that in each there was some slowness and slight clumsiness in the general execution of movement, the degree of which, however, we did not consider to be incompatible with the respective degree of mental impairment.

Intellect

The severity of the intellectual impairment in each case was confirmed by the I.Q.rating (Dr. R. Cargill): case 1's Gesell rating was 32, and case 2's intelligence quotient on the Terrman-Merrill scale was 50. Case 1 had a vocabulary of about 12 words, but case 2 had about 50 words. Case 1's perception seemed to be of a higher standard than her execution. Each child was docile, and there did not appear to be any emotional disturbance in either.

Cardiovascular System

The murmur heard in each child was similar in location, character, and intensity. Clinical examination of the heart in each case revealed no other abnormality, and this was confirmed radiologically. It is thought possible that each child has an interventricular septal defect.



a *b*

Fig. 3—Standard urine aminoacid chromatograms: *a*, case 1; *b*, case 2.

Note extraordinary similarity between these two affected sibs and great difference from published normals (Dent and Walshe 1954). In each chromatogram the strongest spot is the unknown aminoacid and the weak spot above and slightly to the left of it is the substance to which it can be readily converted by hydrolysis.

Blood-groups

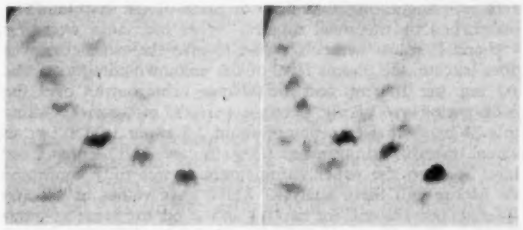
We are indebted to Dr. F. Stratton for determining the blood-groups (table II). It is presumably a chance finding that the two sibs have identical phenotypes.

Alkaline Phosphatase

In each child the level of alkaline phosphatase, on each occasion on which it was estimated, was moderately high. We cannot offer any explanation of this. Though it was established in the mother's third and fourth pregnancies (fig. 1) that there were then no maternal antibodies which might produce fœtal kernicterus, the ataxia seen in case 1 and the type of ambulation in case 2 in infancy might in each instance have been caused by abnormality of the basal nuclei. Liver function, assessed by our empirical tests, was not disturbed; but, since a high alkaline-phosphatase level may be a sign of liver disease, further attention should perhaps be given to this abnormality.

Urinary Excretion of Aminoacids

Since the discovery, in the urine of both case 1 and case 2, of a grossly abnormal aminoacid excretion, which was not present in the urine of other members of their family, repeated analyses of further samples of their urine have confirmed the original findings. The abnormality appears to be constant qualitatively and quantitatively in both children. The nature of this may be seen from fig. 3. It will be noted that it mainly comprises the excretion of a large amount of one ninhydrin-reacting substance,* but there is a small amount of another substance close to it on the chromatogram. Neither of these can be matched in their chromatographic behaviour with any of the known aminoacids in our very large collection of these compounds, or with any of our catalogued "unknowns" such as have been found, for instance, as a result of detailed studies of normal urinary constituents by Westall (1955). It is also remarkable



a *b*

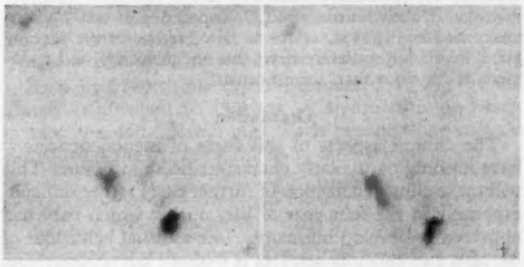
Fig. 4—Standard aminoacid chromatograms of plasma: *a*, case 1; *b*, case 2.

The weak spot low down on the right in both cases is the unknown aminoacid. Immediately above it is a strong spot due to glutamic acid. This spot is unusually strong owing to its formation from glutamine during storage of the specimen. The other aminoacids present are otherwise quite normal.

that the aminoacids normally excreted—e.g., glycine, alanine and taurine—are, if anything, excreted in this urine in smaller quantities than usual.

We cannot yet suggest any chemical structure for the main urinary constituent. It has not so far reacted with reagents which we have tried for specific chemical groupings—e.g., indole, glyoxaline, and ester phosphate—or with tests likely to reveal dicovalent sulphur. The main spot is very easily hydrolysed to the subsidiary spot (also unidentified) which appears weakly immediately above and to the left of it on the urine and C.S.F. chromatograms (figs. 3 and 5). The change goes virtually to completion in 5 *N* hydrochloric acid at 100°C

* Further work on the identification of the unknown ninhydrin-reacting substance in the urine of the two affected sibs suggests strongly that it is not (as we have assumed above) a single aminoacid but a peptide which is rather resistant to acid hydrolysis.



a *b*

Fig. 5—Standard aminoacid chromatograms from C.S.F.: *a*, case 1; *b*, case 2.

These are quite normal except for the large strong spot low down to the right which is due to the unknown aminoacid. Note how much stronger this substance is here than in the plasma. Equal volumes of C.S.F. and plasma were analysed on these chromatograms.

in 15 minutes. If the urine is not fresh, at least two further unidentified ninhydrin-reacting spots are seen on the chromatogram in addition to the main spot, these also being presumably decomposition products of the main spot. The production of one of these further spots also appears to occur on electrolytic desalting of the urine. A large stock of these compounds in the crude state has been isolated from the urine for identification.

Chromatograms of the plasma and C.S.F. were also prepared according to our standard methods (Dent 1951) and are shown in fig. 4. The low plasma concentration of the unknown spot occurring in the presence of a very high urinary output suggested a high renal clearance and was confirmed for case 2 by determining his renal aminoacid clearances in a fasting 3-hr. urine collection and collections of blood at 1 and 2 hr. pooled before being analysed by the Moore and Stein (1954) method. The clearance of the unknown spot was 105 ml. per min. per 1·73 m.², suggesting that little or none of the compound is reabsorbed by the renal tubules. If its molecular weight is 150 and it reacts with ninhydrin to give the same colour as does leucine, the plasma level of the unknown compound was 1·7 mg. per 100 ml. and the average urine output over the 3-hr. period was 1·8 mg. per min. per 1·73 m.², corresponding to a 24-hr. fasting excretion of about 2·5 g. per 1·73 m.² or an actual uncorrected output of 1·3 g. in case 2. The high C.S.F. level seen on the paper chromatograms was fully confirmed on Moore and Stein analysis, which gave values of 4·2 and 5·1 mg. per 100 ml. for cases 1 and 2 on the same assumptions as stated above, this being 2·5–2·9 times higher than the plasma level. No other aminoacid concentrations, excretions, or clearances were disordered to any comparable extent.

Head Size

Prof. L. S. Penrose reported as follows:

Case 1, aged 4 years: length 131 mm., breadth 168 mm. Norms for female aged 4 years are 134 mm. and 169 mm. respectively.

Case 2, aged 7 years: length 135 mm., breadth 175 mm. Norms for male aged 7 years are 141 mm. and 179 mm. respectively.

Both children have normally shaped heads but with dimensions below the average. In neither case is the deviation sufficient to be classed as abnormal, but in case 2 it is borderline.

Hair Colour

Specimens of hair from parents and four children were examined, and the reflection of light over the range of the visible spectrum was measured by Dr. N. A. Barnicot, who reported as follows:

"As is usual, the four children have hair of lighter shade than that of their parents because of the normal tendency for hair to darken with advancing age. There is no apparent tendency for the affected children's hair to be lighter in colour than that of their normal sibs. One specimen of case 1's hair, taken on Dec. 5, 1956, seems to be of rather brittle texture, but it is difficult to demonstrate this unequivocally, and specimens taken since then seem normal."

Discussion

The clinical aspects of this form of mental deficiency have nothing particularly characteristic about them. This will make clinical detection of further cases rather difficult, especially in the first year of life, during which they had appeared to develop normally. The unusual behaviour of M. after her epileptic seizures is perhaps not so surprising in view of her very severe mental deficiency. Presumably disturbances produced by epilepsy are much more severe when cerebral function is already grossly subnormal. The excessive friability of the hair was certainly unusual. The friability was somewhat variable, for M., when first seen, had a short crop of hair which did not need cutting and did not for some time grow longer. A year later it had grown better and was a few inches longer in places. There were no other ectodermal abnormalities that we could discover.

The fact that the two sibs were so similarly affected is of great importance, and it will be necessary in future to confirm that this means, as we think very likely at the moment, that the disease is hereditary. We could not discover any possible environmental factors that might have been operative, and rhesus incompatibility was adequately excluded. The fifth sib required an exchange blood-transfusion at birth because of hæmolytic disease. However, no antibodies were found when the mother had been examined during the third and fourth pregnancies and they did not appear till the end of the fifth pregnancy.

The discovered biochemical abnormality was quite spectacular. The unknown substance was found in all specimens of urine of cases 1 and 2 that were examined; all the other members of the family had normal aminoacid patterns shown by paper chromatography. These all-or-none findings argue in favour of a genetic causation. The unknown substance was excreted in very large quantity, and the other aminoacids normally excreted in urine were present, if anything, in smaller quantities than usual (fig. 3).

Our analyses of the C.S.F. and of the plasma of cases 1 and 2 are especially interesting. In healthy people the aminoacids that are present in the plasma are all present in the C.S.F. in greatly reduced concentrations, except glutamine, which is present in about the same concentration. In phenylketonuria, in which the biochemical abnormality—namely, inability to metabolise phenylalanine—is present in the liver, phenylalanine accumulates in the plasma and is thereupon excreted into the urine by an overflow mechanism, and it leaks also into the C.S.F. to reach a concentration of about a third of that in the plasma. In the disease we have here described the situation is entirely different. As can be seen from the paper chromatograms, and confirmed by quantitative analysis, the C.S.F. concentration of the unidentified aminoacid (fig. 5) is much higher than in the plasma (fig. 4), about 2·5–2·9 times or so as high. This suggests at once that the substance is formed not by a defective enzyme in the liver or in any other organ in close relationship to the systemic blood-supply but in the brain or in some other structure closely associated with the C.S.F. It leaks, presumably, from there into the blood-stream, whence it is rapidly excreted by the kidney into the urine, probably without any tubular reabsorption. This latter situation seems to occur when other presumed purely intracellular substances find their way into the plasma, which they do not normally use as a means of transport. Examples of such compounds are phosphoethanolamine (our unpublished results on the study of hypophosphatasia), homogentisic acid (Neuberger et al. 1947), β-aminoisobutyric acid, at least in high excretors of this substance (Evered 1956), and porphobilinogen (Goldberg and Rimington 1954). The mechanism of excretion is such cases is not fully described in terms of the definitions previously made of "renal" and "overflow" mechanisms (Dent and Walshe 1954). Perhaps it should be called a "no-threshold" aminoaciduria.

Our present speculation is therefore that the disease has revealed for us a substance which is normally produced by and metabolised in the brain but which in this

disease cannot be normally dealt with. If this is so, its normal concentration in the body must be exceedingly low because it does not seem to have been found before by other workers studying brain extracts or biological fluids, and was not even found by Westall (1955) in his very detailed study of the aminoacid composition of normal urine, a study based on an analysis by micro methods of concentrates from 100 litres of normal urine.

It is intriguing to consider the strong possibility that an organic cardiac lesion also exists and is related to the biochemical abnormality. With the discovery of serotonin (5-hydroxytryptamine) and of the cardiac lesions associated with its overproduction by argent-affinomata (Sjoerdsma et al. 1956) the stage is set for the association of further cardiac lesions with other humoral factors.

Our further consideration of the cause of the disease and of its possible treatment must await identification of the unknown substance. The disease is certainly extremely rare because, apart from the fact that we and others have never observed it in the course of many thousand chromatographic examinations of urine, a deliberate search for the condition among 1500 mentally defective patients has so far failed to reveal a further case (H. Harris, private communication). This search is being continued.

Summary

A family is described in which two of four children of unrelated parents show a severe degree of mental retardation.

Both affected sibs have grossly abnormal electro-encephalograms. One has had several epileptiform convulsions followed by ataxia of a few days' duration. Both sibs have friable hair and systolic murmurs but are otherwise healthy and normal on physical examination.

The two affected sibs have an identical and highly specific gross disorder of aminoacid metabolism not present in any other members of the family. This is most easily shown by the constant excretion in their urine of large quantities of a new and still unidentified substance. There are also minor changes in the pattern of the aminoacids excreted.

The abnormal substance was found in low concentrations in the plasma of the affected children but was present in very much higher concentration in their C.S.F. It seems possible that it is formed in the brain or in some other organ in close association with the C.S.F., whence it leaks out into the plasma and is rapidly excreted by the kidneys.

Apart from acknowledgments already made in the text, we wish to thank also Miss V. Ward for technical assistance and Miss B. Warland for help with the family survey.

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CHRONIC ASTHMA TREATED WITH POWDER INHALATIONS OF HYDROCORTISONE AND PREDNISOLONE

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OUR small trial of the treatment of chronic asthma with aerosol hydrocortisone proved disappointing (Brockbank et al. 1956). Better results have been obtained in a blind trial of hydrocortisone and prednisolone powder inhalations. The manufacturers kindly provided us with hydrocortisone ('Cortef'), a much smaller supply of prednisolone ('Delta Cortef'), and an undetectable blank inert powder consisting of lactose and 1% calcium stearate, all in sausage-shaped capsules, for use in a special inhaler.

Method

The materials were placed in numbered bottles in random order by a member of the staff of the Department of Medicine and were used in number sequence on patients whom we considered to be suitable for trial. These all had chronic asthma and used much antispasmodic material. They were seen by us at least a week before they were included in the trial and were not improving spontaneously during this period. When the trial was completed, we assessed each case and reported to our colleague and learnt for the first time what had been in each bottle.

Each patient was provided with fourteen capsules, which needed pricking with a pin at one end before use. The capsule was then inserted in the inhaler, pinhole uppermost. Sharp pressure on the rubber bulb jerked the capsule upwards until its progress was checked, thus expelling a surprising amount of powder.

The patient was instructed to use the inhaler thrice daily irrespective of spasm. On each occasion the bulb was to be given three good sharp squeezes, holding the inhaler upright in the mouth and breathing in at the critical moment. Care had to be taken not to breathe out into the inhaler; otherwise the moisture caused the powder to clog.

When the capsule was half empty it was taken out, and the top half was removed. The inhaler and capsule had then to be kept upright, or the powder spilled out. One capsule lasted on average five days. The period of treatment was about seventy days and was followed by a month without any of the powder inhalation.

Patients were instructed to use their own antispasmodic material as required, but in successful ("much improved") cases the need for this vanished. They were also asked to keep a diary of the number of attacks of spasm and the amount and type of antispasmodic material required during the trial.

Each hydrocortisone capsule contained 15 mg. of the acetate (equivalent to 13·4 mg. of hydrocortisone base), making the daily dose 3 mg. Each prednisolone capsule contained 5 mg., making the daily dose 1 mg.

TABLE I—ANALYSIS OF MATERIAL

Treatment	No. and sex of patients	Age (yr.)	Duration of asthma (yr.)
Hydrocortisone	24 (8M 16F)	16–63 (av. 42)	0·5–45 (av. 13)
Prednisolone	7 (3M 4F)	26–57 (av. 44)	3–30 (av. 13)
Blank	13 (6M 7F)	25–66 (av. 45·5)	3–32 (av. 14)
Total	44 (17M 27F)	16–66 (av. 43)	0·5–45 (av. 13)

TABLE II—CLASSIFIED RESULTS

Result	Hydrocortisone	Prednisolone	Blank
Much improved	13	1	2
Improved	4	—	3
No better	7	6	8
Total	24	7	13

Progress was assessed according to the lessening of attacks in duration and frequency, the lessening of the need for antispasmodic material, and the improvement in health and mobility. The dosage was so small that no side-effects of steroid therapy arose.

Results

The details of our patients are shown in table I. Our results are shown in table II. The cases treated with hydrocortisone are analysed in table III. The details of the successful cases do not materially differ from those of the unsuccessful; the patients tended to be a little younger but more chronic.

The duration of the remissions was precisely similar for the much improved and improved groups, varying from two weeks to four months (average six weeks). 5 patients returned to hydrocortisone inhalations—3 with improvement, 2 without. These latter thought that the material obtained from the chemist was not the same as we had provided.

To assess our results statistically we grouped the much improved and the improved cases together and compared them with the number of failures.

It appears that the hydrocortisone produces significant benefit; the probability that results as good as these should have occurred by chance alone is only 0·028. The number of patients treated with prednisolone is too small to lead to firm conclusions. There is no evidence of improvement over the placebo, but the results are significantly inferior to the hydrocortisone (P=0·029).

Discussion

The dosage of hydrocortisone acetate given by inhalation in our patients was so small that the beneficial effects must have resulted from a local action on the bronchial tree and not to a systemic effect after absorption. This action is presumably similar to that of steroids applied topically in skin diseases. When used in this way in dermatology hydrocortisone is superior to prednisolone (Frank and Stritzler 1955). The reason for this is not clear, but it may explain why there was no significant benefit in our patients treated with prednisolone inhalations. Difference in solubility of the two steroids will not readily explain the different results, because hydrocortisone acetate is said to be insoluble in water, whereas prednisolone is almost insoluble (*British Pharmaceutical Codex 1954*: Supplement 1957, pp. 29 and 60). The lack of solubility of hydrocortisone acetate, however, may explain why the powder gave a beneficial effect by inhalation whereas none was demonstrated in our previous trial using a solution of hydrocortisone hemisuccinate. The solution may well have been rapidly absorbed without there being sufficiently long contact between the hydrocortisone and the bronchial mucosa for any beneficial effect to result.

TABLE III—ANALYSIS OF PATIENTS TREATED WITH HYDROCORTISONE

Result	No. and sex of patients	Age (yr.)	Duration of asthma (yr.)
Much improved	13 (4M 9F)	16–58 (av. 40·5)	0·5–45 (av. 17)
Improved	4 (1M 3F)	35–48 (av. 43)	3–19 (av. 7·5)
No better	7 (3M 4F)	21–63 (av. 46)	4–15 (av. 9·5)
Total	24 (8M 16F)	16–63 (av. 42)	0·5–45 (av. 13)

Summary and Conclusions

The value of hydrocortisone acetate and prednisolone powder inhalations in the treatment of chronic asthma has been assessed by a blind trial method.

Of 24 patients receiving the hydrocortisone acetate powder 17 were improved or much improved, a statistically significant figure compared with the results obtained in 13 patients with a blank inert powder.

There was no evidence in 7 patients that prednisolone was of any value when used in this way.

In our opinion this simple method of administering hydrocortisone acetate is well worthy of trial in the less severe cases of asthma.

We are grateful to Dr. Avery Cotton, of the Upjohn Company of America, for sending us the material; and to Dr. E. W. Emery, lecturer in medical physics, and Dr. S. W. Stanbury, lecturer in medicine, for their help.

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TIME OF RECURRENCE OR CURE OF TUMOURS IN CHILDHOOD

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Collins et al. (1956) have given theoretical reasons why the period is limited within which a treated neoplasm may recur (the "period of risk"). They showed that this held true in the results with 206 children from several series treated for Wilms' tumour (embryoma). There were no deaths or recurrences after the defined period of risk had ended. Patients surviving after the period of risk could be presumed to be cured according to a definite biological criterion. The existence of such a limit to the time within which treated tumours might recur would be clinically useful, and important in the study of the natural history of neoplasms. The present study was undertaken to see whether the experience with three types of childhood tumours (Wilms' tumour, neuroblastoma, and rhabdomyosarcoma) in a total of 244 children seen in a single institution confirmed the findings of Collins et al.

Method

Determination of the period when recurrence is possible is based on knowledge of the growth-rate of a tumour before treatment and extrapolation of this rate after treatment for a period long enough for even a single cell left behind to regrow to a tumour of diagnosable size. This time after treatment is the "period of risk". The

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choice of children as subjects for this study follows the ingenious use, by Collins et al., of the results with Wilms' tumour to test their hypothesis. The growth-rate of tumours before treatment is not generally known for any group of patients, but in children this rate can be assumed within relatively narrow limits. The tumour can have grown only since conception, or later, to reach its particular size at the time of treatment. The continued growth at the same rate of even a single cell for a period equal to that designated by the age of the child at treatment (plus nine months' gestation) would result in a tumour mass at least equal to that originally present at treatment. Therefore, if there is to be a recurrence it should appear before the end of the period of risk, at which time the child will be twice the age (plus nine months) that he was at the time of treatment. For example, a child treated at one year of age will reach the end of the period of risk one year and nine months later, or at the age of two years and nine months; a child five years old, at ten years and nine months of age. Tumours that develop later than conception, or that increase their growth-rate, would recur well before the end of the period of risk, as defined here. Slowing of growth-rate, spontaneously or as a result of treatment, could result in recurrence after the end of the period of risk and would negate the prediction.

Two time-periods were ascertained for each patient: (1) the time before treatment (age plus nine months' gestation), and (2) the time after treatment until the first recurrence of the tumour or the last negative follow-up. Periods were determined to the nearest month. In some patients in whom death followed shortly after the recognised recurrence and early in the period of risk, the time of death was accepted in lieu of fixing exactly the time of recurrence. In patients surviving late into the period of risk, the time of recurrence was fixed more exactly by the date of the first objective signs found by radiographic, or, less commonly by clinical, examination. A few patients with documented recurrences late in the period of risk survived well beyond the end of the period of risk, sometimes with supplementary or palliative treatment. The delayed deaths of these patients did not vitiate the prediction of the time of their recurrences, since they had already shown evidence of recurrence of malignancy within the period of risk.

Patients

Records were found for a total of 244 patients treated at the tumour therapy clinic of the Children's Medical Center, Boston, during the past two decades, for the three types of tumours selected. These particular tumours were selected simply because they are common. The diagnoses in all patients in this study were confirmed by histological examination. In each group the ages of patients ranged from newborn to about 16 years. No selection was made as to the mode of therapy.

Wilms' tumour.—This was diagnosed in 92 patients. The treatment was generally that of Gross and Neuhauser (1950). 5 patients were lost to follow-up immediately after hospital discharge, while still apparently well, and these were not incorporated in the series. Of the 87 remaining patients 27 were alive and without recurrence at the last follow-up, and 60 had died or had had recurrences. There was objective evidence from biopsy, necropsy, or X-ray examination, in 58 of the 60, for the presence of recurrent Wilms' tumour. 2 other patients died at home of recurrences diagnosed solely on clinical grounds. 15 of the patients without recurrences were beyond risk.

Neuroblastoma.—126 patients with this diagnosis attended the tumour therapy clinic. Nearly all of them received chemotherapy, usually after surgery and radiotherapy, as indicated. At the time of the last follow-up, 18 patients were alive, with no evidence of recurrence, and 108 had already had recurrences. 14 patients were beyond risk.

TABLE I—SUMMARY OF RESULTS IN ALL PATIENTS STUDIED

	Recurrence		No recurrence		Total
	Dead	Alive	Period of risk	Safe period	
Wilms' tumour	52	8	12	15	87
Neuroblastoma	102	6	4	14	126
Rhabdomyosarcoma ..	22	2	3	4	31
Total	176	16	19	33	244

Rhabdomyosarcoma.—31 patients with this diagnosis were studied. The therapy was the same as that described for the previous group. At the time of the last follow-up, 7 were still alive (4 of them beyond risk), and 24 were dead or had recurrences.

Results

The overall results are shown in table I. Separate graphs have been made for the three different tumours (figs. 1–3). The time before treatment (age plus nine months) was graphed against the time after treatment to recurrence or last follow-up for each of the patients. A line drawn at 45° through the origin separates the period of risk from the safe period, and all recurrences can be seen to fall wholly within the period of risk. The patients followed long enough to be in the safe period without recurrence are presumambly cured. Those with the period of risk, but negative at the last follow-up, are critical cases which should be followed closely until they are beyond risk.

Discussion

The results in three of the commonest tumours of childhood confirmed the observations by Collins et al. in a heterogeneous collection of 206 cases of Wilms' tumour. There were no recurrences after the safe period was reached. A single recurrence in the safe period would

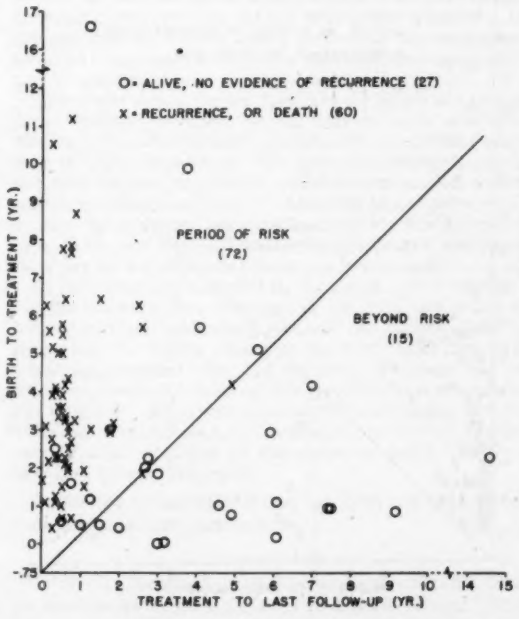

Fig. 1—87 cases of Wilms' tumour.

disprove the thesis of an invariably constant or increasing rate of growth in tumours despite therapy. The results obtained are consistent with this thesis though they do not supply positive proof of it. The qualitative dichotomy of the post-treatment time into two periods—a period of risk and a safe period—is clear and arresting.

There is a highly significant difference in the results during these two periods by the x^2 test, but it is difficult to prove that this distribution did not arise by chance, because all tumours tend to recur early, long before the end of the period of risk. It is possible only to show, as did Collins et al. (1956), that the number of individuals cured by their criterion (i.e., reaching the safe period) was equal to that fraction of the whole group who were dying at a normal rate instead of an accelerated rate (i.e., equal to the "proportion cured," calculated from the statistics of the whole group by the method of Boag [1949]). The essential value of these results, however, is the application of a criterion of cure to an individual. The combined experience with a total of 293 Wilms' tumours, for example, strongly suggests that the criterion of cure discussed here is reliable.

The existence of a biological criterion of cure applicable to individuals treated for neoplasms will have important uses, even if applied empirically without reference to its theoretical basis. Even more important issues arise from the theoretical considerations. The criterion was developed from the reasonable assumption that neoplastic cells, like other populations, will tend to grow logarithmically at a constant rate under optimal conditions, so that their number (and therefore their mass) doubles in each interval of time. An interval of time after treatment, equal to that period when the tumour could have existed before treatment, therefore limits the period within which a recognisable tumour would recur. These results provide no direct evidence for the way tumours grow, and only circumstantial evidence for the theory itself. The results are

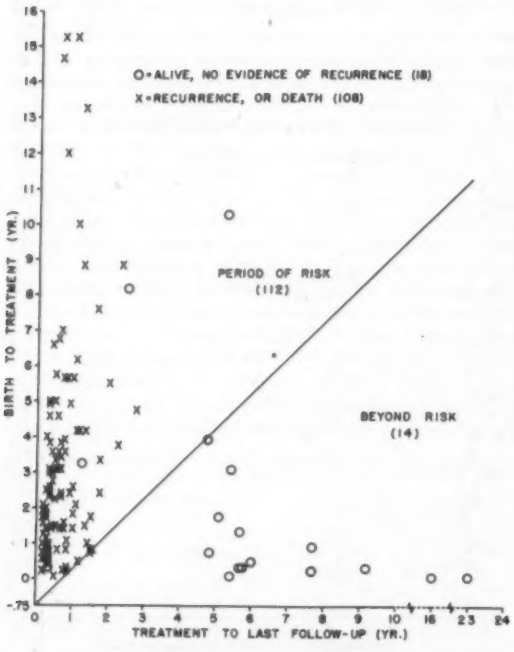
O = ALIVE, NO EVIDENCE OF RECURRENCE (18)
X = RECURRENCE, OR DEATH (108)
PERIOD OF RISK (112)
BEYOND RISK (14)
BIRTH TO TREATMENT (YR.)
TREATMENT TO LAST FOLLOW-UP (YR.)

Fig. 2.—126 cases of neuroblastoma.

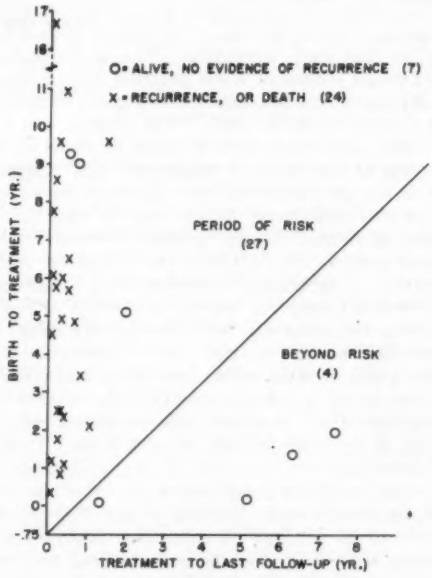
O = ALIVE, NO EVIDENCE OF RECURRENCE (7)
X = RECURRENCE, OR DEATH (24)
PERIOD OF RISK (27)
BEYOND RISK (4)
BIRTH TO TREATMENT (YR.)
TREATMENT TO LAST FOLLOW-UP (YR.)

Fig. 3—31 cases of rhabdomyosarcoma.

consistent with this theory, since in no instance was a tumour found to grow more slowly after treatment. Such exceptions would be of particular interest in guiding tumour therapy.

Positive evidence for the theory may be obtained by the results of longer follow-ups of larger numbers of patients, or by direct determination of tumour growth-rates in individuals of different ages. In either of these ways an important implication of the theory could be tested—viz., that the tumour which grows to a recognisable mass in a young child is growing more rapidly than one attaining a similar mass in an older child. In a series sufficiently large to include late recurrences at each age, it should be possible to show that the disease in younger children usually recurred earlier than in older children. Also, by direct radiological measurement, metastases in young children should be found to grow more rapidly than those in older children. In adults the possible long time-span of tumour growth would prevent significant use of this theory, unless based on actual measurements of growth-rates of the individual tumours.

If the results of this study are accepted, one of the consequences should be the adoption of a sliding time-scale for the follow-up of patients after treatment. Definitive results can be known quickly in young children, but for older children the usual follow-up period should be extended, commensurate with their age at treatment.

Summary

The hypothesis that a treated neoplasm will recur only within a defined period of risk after treatment was tested and confirmed by the results in 244 children with tumours (Wilms' tumour, neuroblastoma, and rhabdomyosarcoma).

All tumour recurrences developed before the end of the period of risk, defined as twice the age at treatment plus nine months.

In 192 cases there was a recurrence. Of the 52 cases in which there was no evidence of recurrence at the last follow-up, 19 were still within the period of risk. The remaining 33 were beyond risk and therefore could be assumed to be cured.

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TREATMENT OF UNDULANT FEVER

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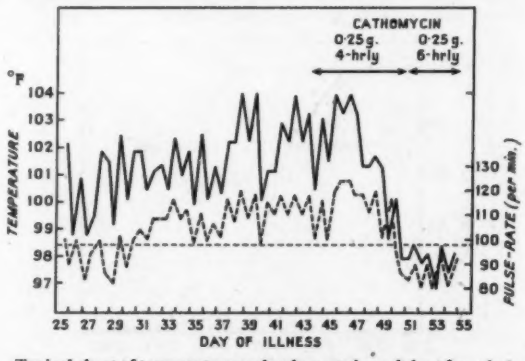
UP to a few months ago we did not have a specific and efficacious antibiotic with which to treat undulant fever. Neither streptomycin nor aureomycin, let alone vaccines, gold compounds, &c., was surely therapeutic in this infectious disease; and invariably the end-results, after treating the patients with these antibiotics, were complete failures, because almost constantly the disease recurred. Even without complications—e.g., spondylitis, which cripples for life—undulant fever used to last a year or two.

Some months ago a new antibiotic, 'Cathomycin', was supplied to us for treating infections resistant to penicillin. For various reasons and of my own initiative I used it to treat patients with undulant fever. After treating the first few cases, I realised that cathomycin is a specific effective antibiotic in undulant fever. Up to now we have treated 26 patients, who have been discharged from hospital completely cured, and not one has had a recurrence. Of the 26 patients treated 20 had produced a positive blood-culture on admission and the remaining 6 had a positive agglutination test. Only the 20 patients with a positive blood-culture are discussed here. Their details are shown in the accompanying table. We treated the patients only when the undulant fever was at its height.

The constant effect of cathomycin was remarkable (see figure). During the first five days' treatment no change is apparent; the pyrexia continues as before, and the symptoms remain just the same; but almost always on the fifth day the pyrexia resolves by crisis and all the symptoms (headache, insomnia, articular pain, anorexia, sweating, &c.) disappear. Splenomegaly also disappears, and by the end of the treatment the spleen has returned to its normal size and shape, no matter how large it was. None of the patients relapsed.

Dosage.—A capsule containing 0·25 gs. was given four-hourly until the day after the crisis (usually the sixth day) and then six-hourly for nine days to a total of 18 g. Of course this dosage applies only to adults.



Typical chart of temperature and pulse-rate in undulant fever before and during treatment with cathomycin.

ANALYSIS OF CASES OF UNDULANT FEVER AND TREATMENT

Case no.	Sex	Age (yr.)	Duration of disease before treatment	No. of days' treatment before crisis	Temperature at beginning of treatment (°F)	Total dose of cathomycin (g.)
1	F	35	2 mos.	5	98·6—100·4	14·0
2	F	36	1 month	6	98·6— 99·5	12·0
3	M	7	1 month	5	100·4—102·2	13·5
4	M	33	3 mos.	5	99·5—102·2	27·0
5	M	52	1½ mos.	5	99·0—102·2	17·5
6	M	31	2 weeks	10	100·4—104·0	20·0
7	M	11	2 weeks	6	101·5—103·6	13·5
8	F	26	10 days	6	100·4—101·3	13·75
9	M	30	3 weeks	5	99·5—100·4	17·5
10	M	27	1 month	5	100·4—102·2	20·5
11	M	30	1 month	6	101·3—103·1	16·0
12	M	17	2 weeks	4	100·4—102·2	18·7
13	M	45	2 mos.	5	100·4—103·1	20·0
14	M	52	2 weeks	5	99·5—102·2	20·0
15	M	45	2 mos.	5	99·1—103·1	18·0
16	M	57	1 yr.	4	98·6—100·4	18·0
17	M	19	3 mos.	5	99·5—100·4	18·0
18	F	7	1 month	5	100·4—101·3	12·5
19	F	32	1 month	5	100·4—101·4	18·0
20	M	18	2 mos.	5	100·0—101·3	18·0

Laboratory Findings.—On the third day of treatment liver-function tests (Kunkel's, Maclagan's, Hanger's, and Wührmann's), which were frequently made, were always negative. The leucopenia, which sometimes was very severe, rapidly disappeared. Anæmia, which also is common in undulant fever, gradually returned to normal. The platelet count was usually normal and did not vary in any way during the treatment. No organic alterations were found.

Psychology.—The patient's state of mind was much improved as soon as his temperature had returned to normal. Many of the chronic patients who had become pessimistic became cheerful and self-confident again after losing their fever and pain.

Side-effects.—A quarter of the patients manifested intolerance of cathomycin.

Case 10 (see table) during the first three days of treatment had hyperchlorhydia, which was relieved by alkalis without stopping the treatment.

Case 5 had a generalised urticarial rash, with pyrexia up to 104°F, but with the patient's cooperation we did not withhold cathomycin but gave him the full fifteen days' treatment. On the day that he stopped having cathomycin his temperature returned to normal; two days later the exanthema disappeared, and he was discharged completely cured.

Case 6 was treated for ten days. On the eighth day an urticarial eruption appeared, causing him so much discomfort that we had to withhold cathomycin for two days, during which time the rash disappeared. We gave him cathomycin again, but after the third capsule the exanthema reappeared, accompanied by pyrexia up to 103°F. Since the patient asked us not to stop the treatment, we carried on for the remaining four days. Two days later all his ailments disappeared, and on the third day he was discharged home completely cured.

In case 8 urticaria appeared on the eighth day of treatment, but the treatment was continued to the tenth day, when we had to withhold cathomycin because the patient could no longer bear the itching caused by the rash. Four days later, when the urticarial rash had subsided, we continued the treatment, but at the third capsule the exanthema reappeared, this time with such severe symptoms that we had to abandon treatment with cathomycin. Although the patient had had only 10 days' treatment he was definitely cured, and three days later he was discharged.

So far the urticarial eruption has been the only inconvenience caused by cathomycin.

Conclusion

In all our knowledge and experience of undulant fever we have never seen or achieved such good results. This infectious disease is completely cured in about five days

without a single recurrence. For these reasons we regard cathomycin as an efficacious and specific antibiotic to be introduced and used in the treatment of undulant fever. If our findings are confirmed, as we feel sure they must be, we may consider the battle against brucellosis to have been won.

HÆMOGLOBIN-H TRAIT IN A NEPALESE GURKHA WOMAN

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SINCE Pauling et al. (1949) described the electrophoretic properties of sickle-cell hæmoglobin, several other types of abnormal adult human hæmoglobin have been detected. Of these, hæmoglobins S, C, D, E, and G have a mobility lower than that of normal adult hæmoglobin, while hæmoglobins I, J, K, and H, that of Cabannes et al. (1955), and the Liberian 2 of Robinson et al. (1956) have a mobility higher than that of normal adult hæmoglobin. Hæmoglobin H differs from all the other abnormal hæmoglobins in having an anodal mobility at pH 6·5, the other hæmoglobins having a cathodal mobility at this reaction.

Hæmoglobin H was described simultaneously in two Chinese siblings settled in America by Rigas et al. (1955) (1956) and in seven Greeks by Gouttas et al. (1955). These patients had hypochromic microcytic anæmia resistant to therapy, with splenomegaly, and with a blood-picture very like that of thalassæmia but accompanied by the presence of hæmoglobin H in the erythrocytes. Hæmoglobin-H trait has also been found in Thais (Minnich etal. 1956), in Indochinese in Indonesia (Lie-Injo Luan Eng et al. 1957), in Filipinos (Motulsky 1956), in Singapore Chinese (Vella 1957), in a Greek Cypriot (Ager and Lehmann 1957), in a Malay (Lehmann and Singh 1957), and in a Trans-Jordanian Arab (White et al. 1956).

The Nepalese Gurkha woman described here presented with a severe hypochromic anæmia and splenomegaly. As the anæmia responded to treatment, she was held to have a nutritional iron deficiency such as is commonly found in her race. Additional support was given to this belief when the anæmia relapsed on her becoming pregnant and when she was found to have ankylostomiasis. The anæmia now responded only partially, despite large doses of parenteral iron. When this ultimate lack of response to treatment was recognised, a thalassæmia-like anæmia was considered, and electrophoresis was carried out. This revealed the presence of hæmoglobin H.

Electrophoresis was done on Whatman filter paper (3 MM) between glass plates measuring 14 in. × 10 in. × 0·25 in., treated with silicone stopcock grease, and clamped with four Waverley clips (no. 3), using veronal buffer pH 8·8 (ionic strength 0·06) and citrate buffer pH 6·5 (ionic strength 0·05). Runs were made in a refrigerator, at about 5°C, at 360V for five or six hours (Chernoff 1955). Alkali-resistant hæmoglobin was measured by the Chernoff technique (Chernoff 1955). Inclusion bodies were demonstrated by supravital staining with brilliant cresyl blue (Gouttas et al. 1955).

Case-report

A Nepalese woman, aged 24, complained of fever soon after arriving in Malaya from India in April, 1956. She was admitted to the British Military Hospital, Singapore, with a temperature of 99°F, pale mucosæ, and slight icterus. Her liver was palpable to one fingerbreadth below the costal margin and a firm non-tender spleen was palpable to two fingerbreadths. Laboratory investigations showed red cells 3,050,000 per c.mm., Hb 6·8 g. per 100 ml., white cells 5100 per c.mm. (polymorphs 57%, lymphocytes 35%, monocytes 5%, eosinophils 3%). Malarial parasites were absent; a blood-film showed poorly filled red cells with considerable anisocytosis and poikilocytosis. Serum-bilirubin 0·4 mg. per 100 ml.; no urobilinogen in urine. Lung fields clear on radiography.

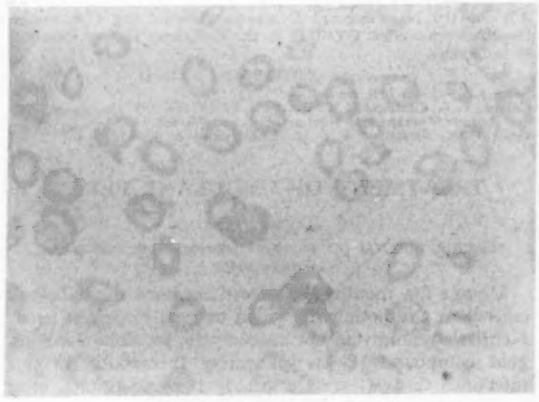

Fig. 1—Peripheral blood smear.

Treatment and Progress

She was treated with oral iron, and in three weeks her hæmoglobin increased to 8·9 g. per 100 ml., and red cells to 3,090,000 per c.mm. A blood-film showed active regeneration. She was discharged from hospital with a diagnosis of iron-deficiency anæmia.

She was readmitted in November, 1956, with symptoms of anæmia and was now twenty-two weeks pregnant. Apart from the pregnant uterus, the clinical findings were essentially the same as at her previous admission. Hb 5·2 g. per 100 ml.; blood-film showed hypochromic microcytic red cells but no target cells; white-cell count normal. Stools contained ova of *Ancylostoma duodenale*.

She was treated with tetrachlorethylene and with 'Imferon'. The anæmia persisted, but the hæmoglobin gradually rose to 9·6 g. per 100 ml. before she gave birth on March 4, 1957, to a premature female baby weighing 3 lb. 13 oz.

She was first seen by one of us (M. C. B.) a month after delivery. On examination she had the typical mongoloid features and short stature of her race. The mucosæ were pale and fingernails and tongue normal. The liver and spleen were palpable to the same extent as before. She had no abnormal physical signs in the nervous, respiratory, and cardiovascular systems, apart from an apical systolic murmur.

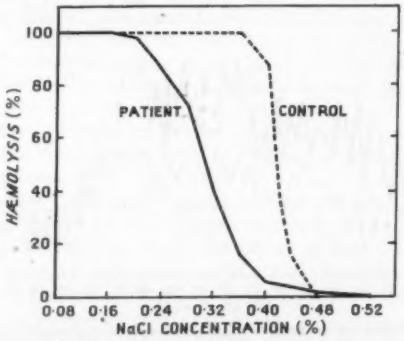

Fig. 2—Osmotic fragility of red cells.

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Fig. 3—Electrophoresis pattern (pH 6·5) of hæmoglobin solutions A and H standards; patient; and normal.

Investigations

Red cells 5,600,000 per c.mm.; Hb 11·5 g. per 100 ml.; packed cell volume 37%; mean corpuscular volume 66 c.μ; mean corpuscular hæmoglobin 21 $\mu\mu$, mean corpuscular hæmoglobin concentration 31%; a stained smear showed considerable anisocytosis and poikilocytosis (fig. 1). No target cells were seen. Sickling could not be induced. Reticulocytes 5%. White-cell count normal. The osmotic fragility curve (fig. 2) showed increased resistance to hypotonic saline solution; there was 5% hæmolysis in 0·4% sodium chloride and 60% in 0·3% sodium chloride. Bone-marrow was very cellular and showed normoblastic erythroid hyperplasia, the myeloid/erythroid ratio being 1/1.

Electrophoresis gave the results shown in fig. 3. Hæmoglobin A 70%, hæmoglobin H 30%; alkali-resistant hæmoglobin 0%.

Supravital staining of peripheral blood with brilliant cresyl blue revealed inclusion bodies in 40% of the red cells (fig. 4). In bone-marrow stained by the same technique 1% of the red cells contained intracellular inclusions. The inclusion bodies were not seen in any nucleated red-cell precursors.

Serum-bilirubin 1·0 mg. per 100 ml.; liver-function tests normal. Serum-albumin 4·4 g. per 100 ml.; serum-globulin 1·85 g. per 100 ml. Urine: no urobilinogen detected. Blood-group O, rhesus-positive. Blood Wasserman reaction negative. Coombs antiglobulin test negative. A test-meal showed acid secretion, which was confirmed by a positive 'Diagnex' test.

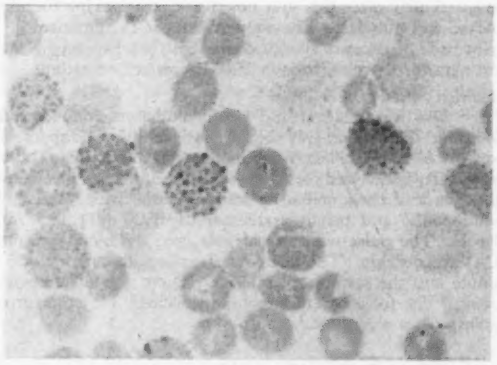

Fig. 4—Peripheral blood stained supravitally with brilliant cresyl blue to show intraerythrocytic inclusion bodies.

Uropepsinogen excretion 57 units an hour. Serum-iron 205 μg. per 100 ml. Stool: no ova of *Ancylostoma duodenale* found in six specimens, no occult blood.

Radiographs of the skull showed an area in which the diploic space was enlarged, but no spiculation was evident. Radiographs of the hands were normal.

Family History

The patient is the youngest of a family of five. Her parents, brother, and three sisters are alive and well but not available for study. Her husband is quite fit and not anæmic; on electrophoresis his hæmoglobin was normal, alkali-resistant hæmoglobin 0%. Her daughter at the age of 6 months was normal for her age:

3,870,000 per c.mm.; Hb 9·9 g. per 100 ml. Blood-film slightly hypochromic but otherwise normal. No intraerythrocytic inclusions bodies. Reticulocytes 1·6%; white-cell count normal. Electrophoresis: at 5 weeks hæmoglobins A+F, alkali-resistant hæmoglobin 60%; at 10 weeks hæmoglobins A+F, alkali-resistant hæmoglobin 40%; at 16 weeks hæmoglobins A+F, alkali-resistant hæmoglobin 17%; at 6 months hæmoglobin A, alkali-resistant hæmoglobin 3%.

Discussion

Hæmoglobin H is the only known abnormal hæmoglobin which in the heterozygous state produces a clinical syndrome of mild anæmia resistant to therapy and associated with splenomegaly and little if any hæmolysis. The diagnosis is possible only on electrophoresis at both an alkaline and a slightly acid reaction, though supravital staining with brilliant cresyl blue will show up intraerythrocytic inclusion bodies of denatured hæmoglobin H on to which the cresyl blue has been adsorbed. It is not yet certain whether these intraerythrocytic inclusion bodies are associated only with hæmoglobin H.

Minnich et al. (1956) have reported inclusion bodies in a case of hæmoglobin-E thalassæmia in Thailand. One of us (F. V.) has shown that both hæmoglobins E and H can be precipitated from solution by adding brilliant cresyl blue or metabisulphite, whereas hæmoglobins A and F are more resistant to precipitation (Vella 1957). Our inability to demonstrate inclusion bodies in the red-cell precursors in the bone-marrow, and the small number of red cells containing inclusion bodies seen there, suggest that a physicochemical change in the hæmoglobin with ageing of the red cell may lead to its precipitation with brilliant cresyl blue. This might explain the marked variability in the quantity and density of inclusion bodies seen in red cells in the peripheral blood.

The peripheral blood-picture in persons with hæmoglobin-H trait has been described as indistinguishable from that in Cooley's anæmia. In fact, these cases are usually classed as thalassæmia syndrome until electrophoresis is done. Motulsky (1956) has concluded:

"In the present state of our knowledge, the demonstration of hæmoglobin H apparently signifies the simultaneous presence of Thalassæmia. Thalassæmia-Hæmoglobin H Disease therefore may be considered a variant of Thalassæmia in which the Thalassæmia gene in a yet unknown manner activates the expression of hæmoglobin H."

Apparently the expression of the hæmoglobin-H gene may also be enhanced by the simultaneous presence of a gene for another abnormal hæmoglobin (Vella and Wells 1957).

Production of hæmoglobin H is controlled by a recessive gene; so far only three cases are known in which people with hæmoglobin H have produced offspring. Rigas et al. (1956) found the child of one of their patients to exhibit an iron-resistant anæmia with target cells and microcytosis but no splenomegaly and no demonstrably abnormal hæmoglobin, and they diagnosed thalassæmia minor. However, one of the patients of Gouttas et al.

(1955) is married to a clinically and hæmatologically normal partner and has produced a child known to carry hæmoglobin H. Our own patient's daughter showed no abnormality of hæmoglobin at the age of 6 months. No abnormal hæmoglobins have yet been detected before the 12th week of life (Lie-Injo Luan Eng 1956).

As no siblings or parents of this patient were available for study, the relation of the hæmoglobin-H recessive gene to the gene(s) responsible for the thalassæmia could not be ascertained in this case.

The initial response of this patient's anæmia to therapy and her relapse on becoming pregnant are attributed to a concomitant deficiency of iron. The failure of the hæmoglobin to rise to a normal level once the ankylostomiasis had been treated and the iron deficiency had been made good, is characteristic of the thalassæmia-like anæmias and agrees with the descriptions published of hæmoglobin-H trait. Once the nature of the anæmia was appreciated, further attempts at "treatment" were discontinued. The patient remains well and symptom-free, leading an active life with a hæmoglobin of between 8·0 and 11·0 g. per 100 ml.

Summary

A case is described of a Nepalese Gurkha woman, aged 24, with hypochromic anæmia, splenomegaly, and ankylostomiasis, partially responding to treatment.

On electrophoresis hæmoglobin H was found to constitute 30% of the total hæmoglobin.

The patient's daughter, aged 6 months, has no abnormal hæmoglobin and is clinically normal.

We are grateful to the Director-General of Army Medical Services for permission to publish, and to Lieut.-Colonel T. E. Field, R.A.M.C., and the staff of the Pathology Laboratory, FARELF, for the hæmatological and biochemical investigations.

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"The problem of air pollution arises from the fact that the cost of curing it is not directly borne by those who would benefit from its cure. This applies whether the pollution comes from an individual householder's smoky chimney or from a large industrial boiler or furnace. Hence, although the financial saving to the nation as a whole from the substantial elimination of air pollution would almost certainly pay the whole of the cost of this elimination, there is no way of making such a payment to those who would have to bear the costs. This means that we either have to find considerably cheaper means of eliminating air pollution than those at present known or some method of subsidising gas cleaning."—Prof. M. W. THRING, F.INST.P., in a preface to *Air Pollution*, a book based on papers given at a conference held at the University of Sheffield, September, 1956. London, 1957.

ANAPHYLAXIS AFTER ORAL SULPHADIAZINE

TWO REACTIONS IN THE SAME PATIENT WITHIN EIGHT DAYS

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AN anaphylactic reaction usually follows parenteral administration of a foreign substance, though it can follow ingestion or inhalation. The reactions described here followed the giving of sulphadiazine by mouth.

Case-report

A lady schoolteacher, aged 41, had had sore throats for about a year, and four months before admission her doctor had given her a course of sulphadiazine.

Eight days before admission she had a sore throat, and her doctor prescribed sulphadiazine as 4 tabs. (2 g.) stat., and 2 tabs. (1 g.) four-hourly. She took 4 tablets, and within half an hour she was "lathered" in sweat, but felt "cold and shivery". She had a tickling cough, but no breathlessness or wheezing, and noted itching white urticarial weals "like large heat lumps up to an inch in diameter" appearing on arms, spreading to face (which "felt tight and prickly"), and then to rest of the body. The urticaria was followed by generalised erythema within an hour. Her mouth was swollen and her tongue stiff, and her skin felt to be burning furiously. She vomited once, but had no diarrhœa or loss of consciousness. She decided not to take the tablets as prescribed during the rest of that day.

Next morning the redness had disappeared, but as her throat was still sore she took 2 tablets of sulphadiazine and continued to do so four-hourly for three days without ill effect. Her throat was then much improved and she felt better and ceased to take the tablets. Thirty-six hours before admission the "bad throat" recurred.

At 11.30 A.M. on the day of admission she took 2 tablets of sulphadiazine. Within half an hour she started sweating profusely and felt cold. Itching urticarial areas 1½ in. in diameter appeared on her arms and spread all over her body, followed by redness within half an hour. At this stage she had an irritating cough with slight wheezing and breathlessness. Then she had violent cramp-like pains in the epigastrium, passing into the lower abdomen in less than ten minutes. She twice vomited greenish-yellow fluid with coincidental severe exhausting diarrhœa, when she felt very weak and ill, and "did not care whether she lived or died". He sister said her colour was greyish purple, with blue lips, and she was groaning and shivering as she tried to sit on the commode. Her eyes were staring and then deviated upwards, followed by loss of conciousness for a few minutes with convulsive movements of arms and legs. Gradually consciousness returned. Her doctor arrived shortly after this and noted that she was profoundly shocked and pulseless. She vomited once in the ambulance.

She had no history of allergic disease, but had had deep X-ray treatment for thyrotoxicosis in 1940. A sister had asthma.

Condition on Admission

Her eyes were staring and her conjunctivæ suffused and bloodshot. Face ashen grey with cyanosis of lips. She appeared too weak to talk, but was trembling enough to cause the bed to shake. Her hands and feet were cold and blue. On her trunk, limbs, back of neck, and scalp were urticaria (with interlacing pseudopodia) and bright erythematous areas. Temperature 97·6°F. The pulse was not palpable, and the blood-pressure (B.P.) irrecordable. The heart-rate (at auscultation) was 138 a minute and the respiratory rate 38. There was no bronchospasm. The tonsils were large and injected. No other gross abnormalities were found.

Course

10 minims of adrenaline 1/1000 solution was given subcutaneously at 2 P.M. Within ten minutes, the trembling had

ceased, but retching and diarrhœa continued intermittently. She gradually improved during the afternoon; another 3 minims of adrenaline was given at 5 P.M. Next morning her pulse-rate was 90 a minute and B.P. 120/80 mm. Hg; there were still occasional urticarial weals on her body. A throat swab revealed *Staphylococcus aureus*.

Discussion

Of special interest are the rapidity of onset of symptoms after administration by mouths and two episodes separated by freedom from reactions while taking the drug.

Dale (1920) postulated a latent period of twelve to fourteen days after the initial exposure to the foreign substance; during this time antibody is formed and becomes fixed in the cells. When the foreign substance again reaches the circulation, any plasma-antibody is precipitated; the excess foreign agent reacts with antibody within the cells to liberate histamine and other substances, which produce anaphylactic manifestations.

Landsteiner (1936) observed that simple chemical substances could combine with proteins in the body to form a modified protein antigen. A molecule containing a benzene-ring nucleus with an $-NH_2$ group attached, or a molecule with a pyrimidine nucleus, is highly antigenic. Sulphadiazine contains both a benzene ring with an $-NH_2$ group, and a pyrimidine group.

The time intervals in this case accord with Dale's hypothesis: a sensitising dose four months before admission; a reaction eight days before, then freedom from symptoms for three days while on the drug, when the antibody in cells had been neutralised; and then a reaction on the day of admission, when the antibody here had again built up in the tissue cells.

My thanks are due to Prof. P. J. Moir for kind permission to publish this report.

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PERIURETERIC FIBROSIS

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PERIURETERIC fibrosis (*Lancet* 1957) is probably not so uncommon as the paucity of published reports thereof suggests. We describe here a further case, in which, as is characteristic of this condition, we followed many false trails before we stumbled on the correct diagnosis.

Case-report

A man, aged 39, was admitted to the medical wards of the Royal Sussex County Hospital on Feb. 25, 1957, because of repeated attacks of vomiting accompanied by a girdle-type pain starting in both loins and radiating to the epigastrium, where it persisted in attacks lasting five hours. For some months he had had vague abdominal aching centred in the region of his umbilicus, and he had lost about 2 st. in weight and felt ill. The pain was unrelated to food, and there had been no disturbance of micturition.

On admission he was thin, ill-looking, and apprehensive but did not present any abnormal physical signs. In view of his nausea, vomiting, and epigastric pain attention was at first focused on his alimentary tract. A barium meal showed no abnormality other than partial loss of mobility of the terminal ileum; this last was thought to be due to adhesions. Examination of the blood showed microcytic anæmia (Hb 11 g. per 100 ml.), white cells 7900 per c. mm., but a surprisingly high blood-urea level (138 mg. per 100 ml.) and serum-potassium level (26·3 mg. per 100 ml.): all the other serum-electrolyte levels being normal. The urine was sterile, with a few red cells and white cells present in the centrifugal deposit. Intravenous pyelography showed a non-functioning right kidney and some early dilatation of the calyces in the left kidney. The fact that the left ureter persistently lay near the midline did not at first attract attention.

Cystoscopy on March 18, 1957, showed a normal bladder, but a catheter could not be passed more than 5 cm. up the right ureter. A further attempt three days later also failed. During this first month the patient's general condition improved spontaneously, as did his blood chemistry, the blood-urea level reaching 264 mg. per 100 ml. before falling to normal levels by the end of March. This spontaneous recovery of renal function, which we now know to be characteristic of periureteric fibrosis, was not appreciated at the time.

Exploration of the right kidney was done on March 28 through an anterolateral approach with a view to either a plastic operation for hydronephrosis or a nephrectomy. Great difficulty was experienced in finding the ureter. For a time what proved to be the dilated upper end of the ureter was taken to be the renal vein as it ran transversely before disappearing into a large firm pinkish mass, which involved all the retroperitoneal structures from the level of the body of L2 vertebra to that of L5 vertebra. The ureter, identified distally, resembled a vas deferens in its calibre and consistence, and was freed down to the pelvic brim. No peristalsis was seen. The mass was thought to be neoplastic, and the changes in the ureter to be due to neoplastic infiltration. Nephro-ureterectomy was then done. Recovery was uneventful.

Pathology.—The kidney measured 11 × 6·5 × 4 cm. and weighed 186 g., with 14 cm. of ureter attached. There was mild hydronephrosis, with dilatation of the upper part of the ureter, but the lower 6 cm. of ureter was contracted and hard, with somewhat the texture of a vas deferens. In the narrowed segment of ureter the lumen was narrowed to a slit but retained normal epithelium. In the wall, lying outside the muscularis but partly infiltrating it was a plaque of young fibrous tissue with patchy lymphoid infiltration, chiefly perivascular. One small arteriole showed what appeared to be subacute arteritis with cellular infiltration of the media and proliferation of the endothelium. The kidney had a distinct zone of lymphoid infiltration at the outer edge of the cortex, with focal lymphoid infiltration, again chiefly perivascular, scattered elsewhere. There were less arteriolar hyalinisation and more round-cell infiltration than are usual in pyelonephritis. This condition affected the renal parenchyma as well as the ureter, and could only be called "inflammatory" by using this word in a very wide sense. Histologically it was more like temporal arteritis or a collagen disease. The appearances resembled those described by Raper (1955) for periureteric fibrosis, except that there was no calcification (see figure).

Prognosis.—It was now appreciated that the prognosis was good, provided that complete ureteric obstruction did not develop on the left side by involvement in this inflammatory mass. The left ureter was already displaced medially,

Sections through right ureter at different levels, uppermost on the left.

as seen previously on intravenous pyelography, but not completely obstructed. A month after the right nephrectomy the left ureter was explored through an anterolateral oblique muscle-cutting incision. The retroperitoneal mass had not extended so far laterally on this side but the left ureter was already embedded in it. It was freed without difficulty, leaving behind a pink shiny trough in which it had lain. The posterior parietal peritoneum was tacked down medially to displace the ureter laterally and to prevent its reinvolvement, because the peritoneum seemed to form a definite barrier to the spread of this inflammation.

Aortography.—Since it has been postulated that periureteric fibrosis begins as arteriolitis in the lumbar and other small retroperitoneal vessels, aortography was done under direct vision at the second operation ; but it did not show any gross abnormality in the lumbar arteries.

Follow-up.—Since discharge from hospital after an uneventful recovery this man has remained well and is symptom-free.

Discussion

Why the retroperitoneal tissues become involved in a mass of young fibrous tissue is unknown. Trauma, previous gastrointestinal disturbances, infection of the para-aortic lymph-nodes, and arteritis like that seen in certain collagen diseases have been suggested as primary causes.

All the published cases have been in males aged 35–60. The history is vague but common to all the cases : months of ill health, with loss of weight, appetite, and strength, followed by aching in the abdomen and loins. Sometimes this aching spreads to the thighs and genitalia. Examination does not reveal any physical signs. Some patients are investigated as an orthopædic problem but may be eventually admitted with oliguria and anuria. Our patient was uræmic on admission. Most of the patients have a few red cells and white cells in their urine at some stage.

The intravenous pyelogram is characteristic, with early hydronephrosis and medial displacement of the ureters. Ureteric catheterisation is important diagnostically and therapeutically but may be impossible because of ureteric involvement ; the fibrous tissue may have invaded the ureter and narrowed it besides kinking it. In patients with oliguria or anuria it is remarkable how urine pours down the ureteric catheter. Renal function appears to be satisfactory ; the ureteric lumen may be patent, but the ureter cannot pass the urine to the bladder, possibly because of lost peristalsis. The indwelling ureteric catheter, if it can be introduced, allows drainage of the distended renal pelvis and tides the patient over the acute obstructive phase.

Treatment is directed solely to prevent progressive ureteric obstruction. No other complication of this large retroperitoneal mass has been reported. This plaque of tissue cannot be removed, because the great vessels and their branches are extensively involved. Surgery has been directed to the release of the ureters and the use of the parietal peritoneum as a barrier against reinvolvement. One case at Mount Sinai Hospital, New York, was treated by radiotherapy in view of the primitive and " invasive " appearance of the fibroblasts in this mass. The patient recovered well, but the development of malignant hypertension in cases of seminoma of testis treated by radiotherapy to the para-aortic lymph-nodes makes one hesitate to use it in a non-malignant condition. Renal damage is often already present and the mass is known to undergo spontaneous regression. Chemotherapy has not been found of value. Surgery seems to offer the best chance of survival. Ureteric catheterisation or nephrostomy is necessary in the very acute phase when anuria is present. The release of the ureters and " protection " by peritoneum can be done in stages. It should be possible to avoid nephrectomy in most cases. We removed the right kidney because the ureter was extensively involved and because the " benign " nature of this mass was not appreciated.

Summary

Periureteric fibrosis is not so rare as the paucity of published reports thereof suggests.

Its ætiology is unknown.

The history is of vague ill health with backache and abdominal and loin pain. The presenting feature may be anuria, oliguria, or uræmia. The intravenous pyelogram showing medially displaced ureters is very characteristic.

Treatment consists in restoring renal function by draining the obstructed kidneys by ureteric catheterisation in the acute phase and by surgical release and peritoneal " protection " of the ureters as a staged procedure. Chemotherapy does not seem to influence this inflammatory mass. Radiotherapy is not advised.

We wish to thank Dr. W. A. Bourne for referring this case to us, and Dr. R. I. K. Elliott for the pathological report.

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Preliminary Communication

HYDROXYDIONE IN PSYCHIATRIC INTERVIEWS

THE two main uses of anæsthetic drugs in psychiatric interviews are exploratory and abreactive. With many drugs these uses overlap, and to prevent affective release the level of anæsthesia has to be deepened, thereby interfering with recall and communication. Following reports [1–4] on the use of steroid anæsthetic agents, with a smooth anxiety-free induction phase and lack of post-anæsthetic depression, we decided to try them in place of amylobarbitone sodium. Thirty-five patients were investigated—predominantly psychoneurotic, but including some with schizophrenia and psychopathic personality.

Hydroxydione (' Presuren ') is prepared as a 2·5% solution in physiological saline solution at 110°F, and is rapidly injected intravenously at this temperature. Great care must be taken that none escapes into the tissues; the greater the speed of injection the less likelihood of venous thrombosis.[5]

There is no clinical effect for three minutes after injection; then the patient relaxes. After five minutes the patient perseverates somewhat, but if the correct dose is used this is the only evidence of altered consciousness. The effect of the drug lasts for about half an hour from this point. The induction phase is invariably smooth, and freedom from anxiety persists. Speech is not slurred. 0·5 gr. was found to be the optimal dose to obtain this effect for the average man of 10 stones; slightly less was used for those under this weight. There was no severe venous thrombosis and no anæsthetic complications—e.g., sudden falls in blood-pressure or excessive shallowness of respiration. No patient complained of any depression after the interview that could be attributed to the steroid.

Except with the catatonic patients, rapport was excellent throughout the interview and the patients freely recalled

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repressed material with no abreactive release. They were uncritical in attitude: often many staff were in the room, but this did not cause them to withhold incidents which they were previously unable to recall even to themselves. One patient, a C. J. voluntary, admitted, while a tape recorder was in action, that he had been doing his best to hoax the staff into believing that he was being cooperative, to avoid remaining in hospital. Several homosexual patients remembered the early childhood trauma, homosexual seductions long repressed. Since no affect was shown at the interviews, methylamphetamine (up to 60 mg.) was injected before or after the steroid; in these cases the patient entered a " perseveratory-ruminative " state, but no affect was exhibited until after the steroid was excreted, when abreaction began on the theme which was uppermost in consciousness during this phase, with excellent therapeutic effects.

The absence of release in the catatonic patients was notable, and there was only momentarily clearing of acrocyanosis. From other work in progress at the moment this effect seems to be due to a lack of parasympathetic inhibition with hydroxydione, in contrast to the barbiturates.

In our limited experience, hydroxydione seems to be excellent where the object of the interview is to uncover the psychodynamics of the illness, especially in patients with early repressed memories; but because of the qualitative difference of effect upon the autonomic system it seems inferior to other agents when abreaction is desired, though this may be overcome by the addition of methylamphetaminé.

We thank Dr. G. J. Harrison, medical superintendent, for permission to undertake this study, and for his and our other colleagues' advice and criticism; and Schering A.G., Berlin, for supplies of ' Presuren '.

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New Inventions

A BLOOD PUMP WHICH MINIMISES HÆMOLYSIS

THE pumps needed to operate such devices as the artificial heart-lung and kidney raise several problems.

They must produce the least possible coagulation (to reduce the need for heparinisation), and they must be built entirely of materials which do not favour coagulation and which are neither toxic nor attacked by blood.

They must produce the least possible hæmolysis—i.e., they must be free from sudden movements leading to turbulence, and the valves must be efficient, for reflux of blood would lead to the shock of two columns meeting.

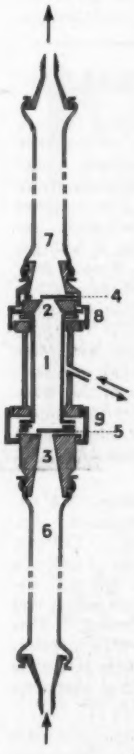

Fig. 1—The construction of the pump.

DESIGN

We have developed a pump (fig. 1) built entirely of methyl methacrylate and silicone. It consists essentially of three chambers: a central one (1, fig. 1), an inlet (6), and an outlet (7).

The central chamber consists of a silicone tube locked into a methacrylate sleeve. The sleeve is connected to an air-compressor, which periodically increases the pressure inside the sleeve. This increase compresses the silicone tube, which thus acts as a cardiac ventricle. The increase of pressure is gentle and uniform, because it is produced by an increase in the pressure of a gas exerted on a soft flexible wall. The propulsion of the blood is very similar to that in the heart.

This central chamber is tapered at its outlet end (2), which is used as a valve seat. The tapering reduces the calibre gradually and the blood in systole slides smoothly along the walls. This part is fixed to the main chamber by a methacrylate ring (8), which tightens it against the wings of the silicone tube.

The valve (4) is a silicone tongue-valve. Inside the tongue is a lead core to give it a certain inertia and make the closing movement more regular (this lead does not come in contact with the blood).

At the lower end of the central chamber is another similar valve (5) which lies on the lower wing with a methacrylate washer to make a more perfect adjustment than is possible between silicone and silicone. The upper end (3) of the lower chamber (6) is tapered in the same way as (2). The upper (7) and lower chambers are silicone tubes, of diameter equal to that of the compression chamber but three times as long. These tubes are fitted over the ends of the central chamber, making use of their elasticity, and at each end is placed a methacrylate connector for joining the pump to the other apparatus.

PERFORMANCE

The damping chambers tend to expand during the systole of the central chamber and to contract during its diastole (fig. 2), transforming the discontinuous current produced by the series of strokes into a continuous current, and preventing the valves from making quick movements. For instance, the lower valve tends to close in systole, but at the same time the tension in the inlet chamber is increased, and this tension is greater the more the valve tends to close; thus, sudden closing is avoided and so is the subsequent danger of hæmolysis caused by sudden stoppage of the blood column.

Fig. 2—Action of damping chambers.

The amount of blood pumped depends on the size of the driving-chamber and the rate of the compressor. For use with the artificial kidney, we recommend a diameter of 20 mm. for all the silicone tubes, and a length of 75 mm. for the compression chamber and of 200 mm. for the damping chambers. A pump of these measurements has a capacity of 160 ml. and gives an efficient stroke-volume with the compressor which we use (piston diameter 60 mm., stroke 70 mm.) of up to 15 ml. The actual stroke-volume depends on whether we direct the whole power of the compressor to the driving-chamber or allow (by means of a special device) a gradual leak of the air driven by the chamber. 30 strokes per min. is the optimum for use with artificial kidneys; with this frequency and the described compressor the flow is up to 450 ml. a minute.

We have pumped 300 ml. of blood continuously, at a speed of 200 ml. a minute, for twelve hours without any hæmolysis, though each erythrocyte has passed about 500 times through the pump. The total volume passed through was 144 litres, or 30 times the normal blood-volume. With the artificial kidney, rarely is more than 15 times the total blood-volume circulated.

For the bigger flow needed with the artificial heart-lung, we recommend a compression chamber of diameter 30 mm. and length 100 mm., and an increased compressor rate. This pump, with an adequate compressor, gives an effective output of 41 ml. per stroke. With a frequency of 100 strokes a minute we obtain an output of 4100 ml. In this case the damping chambers should have a diameter of 30 mm. and a length of 200 mm. The pump thus manufactured has a capacity of 210 ml.

This pump is manufactured by Messrs. R. Bernadas, 46/A Via Layetana, Barcelona.

E. ROTELLAR M.D. Barcelona
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Reviews of Books

Medical History of the Second World War

Army Medical Services. Campaigns: Vol. II. F. A. E. CREW, F.R.S. H.M. Stationery Office. 1957. Pp. 537. 84*s*.

THE second volume in this series has the same plan and the eminent virtues of the first.[1] Its subjects are the defeats at Hong Kong and in Malaya and the second (and victorious) phase of the battles in North Africa. There is also an account of the health of our subarctic garrisons and—probably of the most general interest—a detailed study of the medical aspects of captivity in Japanese hands.

In those years we went where we were sent, did as best we could, and—quite often—were sure that we could have done better for our patients and for ourselves if we had had the ordering of affairs in our own hands. Fifteen years later it is more profitable to forget pompous authority, supplies ill-chosen, late in arrival, or non-existent, the weeks of empty idleness, and the days and nights of endless and sometimes useless toil. If read between the lines this book makes no effort to conceal failure or incompetence, but, without bombast, it shows that there was far more to praise than to blame in the direction of the Army Medical Services. For everyone from the Director-General to the battalion medical officer every new campaign is to some extent a leap in the dark. Plans must be made, men must be trained, and stores assembled at home: the Army Medical Department has no infallible soothsayer to supplement inadequate intelligence or anticipation. The personnel are not what A.M.D.I. would choose but what they have in hand. The good soldier is he who can make the best use of all these wherever he finds himself; and, in retrospect, the job was done well far more often than badly. The heroes of this book are the A.D.M.S., D.D.M.S., and D.M.S. who faced and solved so many problems new to them and barely mentioned, we would guess, in the scholarly peace of Millbank. They planned, devised, begged, cajoled, and improvised with two ends in view—to maintain the health of the fighting Army and to succour the wounded as best they could.

There are two lessons to be learned—or relearned. First, no administrator who is not a doctor can have the flexible pragmatic outlook needed to employ slender resources to the most profitable end, and there can be no better evidence than this book that the professional direction of the Army Medical Services must be maintained. The second lesson is not for the professional soldier only and may be the more urgent. By 1939 the lessons of 1918 had been forgotten; if there is another war those of 1945 may have to be learned again at dreadful cost. Those responsible for the planning of civil defence will be neglecting their duties if they do not read these volumes thoughtfully and often.

Artificial Limbs

LEON GILLIS, M.B.E., M.B., F.R.C.S., consultant orthopædic surgeon to Queen Mary's Hospital, Roehampton, East Ham Memorial Hospital, and St. John's Hospital, Battersea. London: Pitman Medical Publishing Co. 1957. Pp. 449. £15.

Ultima ratio regum ran the inscription about the mouths of Louis XV's cannon—"the last argument of kings." "The last argument of orthopædic surgeons" might once have been engraved on the blade of an amputation knife; but today it would not ring true, for the view is now well established that amputation marks not the end but the beginning of a phase of treatment. Since 1948 almost every patient in this country who has undergone amputation—there are a few residential stipulations—has been entitled not only to an artificial limb (and a spare duplicate) but also to the help of a fitting service prepared to advise and train him in its use.

Mr. Gillis points out that we can justifiably take pride in the fact that Great Britain has led the way in establishing such an organisation. But little has been published about its activities, materials, and techniques; and his new book, based on his experience at Roehampton, fills this gap.

The work, which is complementary to Mr. Gillis's earlier monograph on amputation, is in three sections: one concerned with measuring the patient for an artificial limb and the fitting of it; another with the construction of the prostheses; and a third with methods of reablement. No better survey of British limb-fitting practice, and of tried and tested procedures, could be wished for. The surgeon who studies it will find that he can do much to bridge the gap that still sometimes exists between the surgical ward and the limb-fitting centre.

Livingstone, the Doctor

MICHAEL GELFAND, O.B.E., M.D., F.R.C.P. Oxford: Basil Blackwell. 1957. Pp. 333. 42*s*.

A GOOD account of David Livingstone's journeys is always attractive reading, and in some respects Dr. Gelfand's is even more interesting to the medical reader than earlier ones have been. Its maps are particularly good, and emphasis is laid on the medical side of Livingstone's work, which was considerable and fascinating. His medical observations are some of the earliest records on the diseases of Africa. He was an accurate observer, who had to rely on the simplest aids to diagnosis. He regretted that he had not been able to do necropsies: "No inspection of the body is allowed by their people, and the place of sepulchre is carefully concealed. I had to rest satisfied with conjecture."

Livingstone observed for the first time the association between relapsing fever and the bite of a tick, one of the earliest records of a disease transmitted by an insect. He gave an excellent account of tropical ulcer, a common and very disabling condition at that time; and he probably was one of the first to describe in Africa the boils produced by the maggot fly. Two years later he recorded the presence of an insect (one of the filarial worms) in the aqueous humour of the eye of one of his men. And, above all, he made notable contributions to the study of malaria.

Hewer's Textbook of Histology (7th ed. London: William Heinemann. 1957. Pp. 438. 27*s*. 6*d*.).—Dr. C. L. Foster has extensively revised the sections describing the cell, the connective tissues, the liver and the pituitary, but the other chapters are virtually the same as in the sixth edition. Some new illustrations have been included to supplement the many existing photomicrographs and line drawings. The inclusion of additional figures, without altering the numbering, has necessitated the rather cumbersome use of letters in addition to numbers to designate the new illustrations. Readers may be disappointed to find no mention of sex-chromatin, nucleic acids, or "spreading factors", and no more than a passing reference to amorphous intercellular substance. The very useful appendix on histological methods might well have included an elementary description of electron, phase-contrast, and ultraviolet microscopes. The special virtue of this work remains that the text is concise, clear, and covers the subject adequately; it is very well illustrated; and stress is laid on the relation of structure to function and the dynamic aspects of histology.

British Encyclopædia of Medical Practice (2nd ed. London: Butterworth. 1957). *Cumulative Supplement.* (Pp. 308. 35*s*.). *Medical Progress* (Pp. 339. 37*s*. 6*d*.). (The two together cost 67*s*. 6*d*.)—The *Supplement* is a series of addenda to the *Encyclopædia*, designed to bring it up to date with information which "concerns knowledge of proved value, and neither controversial nor doubtful material is included". This year the *Supplement* has increased its size more than its price. The companion volume contains a series of articles reviewing advances in all branches of medicine, and selected abstracts; its material is newer but more controversial.

Lewis's Medical and Scientific Lending Library.—The new edition of the catalogue of this library, revised to December, 1956, may now be had from H. K. Lewis & Co., Ltd., P.O. Box 66, 136, Gower Street, London, W.C.1. The price is £1 5s. to library subscribers and £2 2s. to non-subscribers.

1. See *Lancet*, 1956, ii, 824.

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See Lancet, July 22, 1899, p. 319

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See Lancet, May 7, 1932, p. 992

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BAYER

THE LANCET
LONDON 25 JANUARY 1958

Diabetic Arterial Disease

IN this century of medical revolutions none has been more profound than that affecting diabetes mellitus; for its treatment has been greatly improved and our concept of the disease radically altered. There is some reason to believe that the incidence is increasing in well-fed Western communities, but the expectation of life for diabetic patients—particularly the young—has much increased. Further, the actual causes of death in diabetes have changed. Before the discovery of insulin the commonest cause of death was diabetic coma, but this is now greatly exceeded by cardiovascular disorders. Today vascular disease is the chief problem in the long-term management of diabetes.[1]

It is important to differentiate clearly between the various types of arterial disease. First there is hypertensive arteriolar disease, entirely non-specific, but commoner in diabetic patients than in the rest of the population. Next there is atheroma, affecting only the arteries, and differing only quantitatively from atheroma in non-diabetic subjects. Thirdly—and the most specific—there is the capillary lesion, seen only in the unsupported vessels of the retina and renal glomerulus. Each of these vascular disturbances is quite distinct, having a different pathogenesis, a different course, and different results. Yet they may be found together, so intimately related as to confound all but the most careful inquiries into their separate natures.

Hypertensive changes are usually secondary to renal disease—most commonly pyelonephritis. Urinary infections are so common in diabetic patients that this is no surprise; even in the absence of a history of " pyelitis " or " cystitis " typical lesions are often seen at necropsy. Atheroma, too, may affect one or both renal arteries, and may cause some contributory renal ischæmia; but the resulting arteriolar lesion is in no sense specific, resembling that seen in other types of hypertension.

The incidence of atheroma in diabetic patients is undoubtedly higher than in the general population.[2] Deaths from cardiac disorders and the occurrence of intermittent claudication and gangrene are to be attributed almost entirely to this cause. WARREN and LE COMPTE[3] remark: " atherosclerosis emerges without question as the leading cause of death in diabetes, accounting for over two-thirds of all fatalities." Morphologically and chemically the lesion resembles atheroma in non-diabetic patients, and is similarly associated with raised lipoprotein and cholesterol levels in the serum[4]; but it tends to affect smaller and more distal vessels[2] and is differently distributed about the body. BELL[5] found that the incidence of occlusive vascular disease of the legs was increased forty-fold in diabetic patients; but coronary thromboses and cerebral vascular accidents, though also common, are not nearly as common as that. There must be some other, unknown, factor concerned with localisation. This is not to imply that the upper limbs are spared. Gangrene of the hands[6] has been recorded, and Dupuytren's contracture is common.[7] LUNDBÆK[8] has described a scleroderma-like condition affecting the hands and associated with calcification in the small blood-vessels, which, he believes, is confined to patients with long-standing diabetes. Cerebral vascular incidents, too, are common. They accounted for 231 cases in a series of 913 diabetic patients admitted with neurological involvement to the New England Deaconess Hospital between 1946 and 1951.[9] The syndrome of headaches and ocular palsies, affecting elderly diabetic patients,[10] may also have a vascular basis—probably atheroma.

The specific diabetic lesion affects only the retinal and glomerular capillaries. First thought to be discrete hæmorrhages deep in the layers of the retina, the red dots seen on retinoscopy have been shown conclusively to represent microaneurysms arising from diseased capillaries.[11] They usually coincide with a characteristic glomerular disorder, which has been described as an " intercapillary glomerular sclerosis ".[12] Electron-microscopic studies indicate that the primary lesion may be of the basement membrane[13]; it is associated with the excretion in the urine of cells containing doubly refractile lipid.[14] The retinal and glomerular capillary lesions are linked by a similarity in the histochemical properties of the hyaline material which accumulates in and around their walls, particularly with special collagen[15] and carbohydrate[16] stains. Moreover, the lesions at each of these sites has been related to certain changes in the sera—notably an increase in complex polysaccharides and glucosamine.[17 18] Possibly the relationship of capillary lesions to these substances is similar to that of atheroma to lipoproteins and cholesterol.

We still know very little of the causes and development of vascular lesions in diabetes. Yet we are not powerless to control them. There is abundant evidence

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that the possibility of such complications is greatly reduced by careful control [19]—control as defined by JOSLIN.[20] In addition urinary infections should be treated vigorously, and cryptic pyelonephritis carefully sought. Infection upsets diabetic control, and hypertension increases the risks from atheroma and its complications. The price of longevity is eternal vigilance.

Infectivity of Virus Nucleic Acids

Two years ago we commented [21] on the work of GIERER and SCHRAMM,[22] who had shown that the nucleic acid extracted from tobacco-mosaic virus was infective alone. It was to be expected that this work would soon be followed by similar research on viruses of animals and man, and last summer two preliminary reports [23 24] suggested that infective nucleic acid could be prepared from one of the encephalomyocarditis viruses (Mengo virus) and from Eastern equine-encephalitis virus. Now comes a more detailed account by COLTER et al.[25] of similar investigations with Mengo, West Nile encephalitis, and poliomyelitis viruses.

COLTER et al. homogenised cells infected with these viruses, and then extracted the virus preparations by vigorous shaking with water-saturated phenol. The aqueous phase, separated by centrifugation, was designated "ribonucleic-acid solution," and such solutions were found to have an infectivity of about 0·1% of the virus homogenates from which they were prepared. The next problem was whether this small residual infectivity was due to a few virus particles which had survived the extraction treatment or to viral nucleic acid. First, the "ribonucleic-acid solution" was tested for protein and no detectable protein was found, but this test is not delicate enough to exclude traces of virus. Indirect evidence was then sought by comparing the properties of the infective component of the ribonucleic-acid solution with those of intact virus particles. Distinct differences were found. The infectivity of the ribonucleic acid was inactivated by brief incubation with ribonuclease or simply by long-continued incubation at 37°C, and it was recovered quantitatively after precipitation with molar sodium-chloride solution. In these respects the infectivity of the ribonucleic-acid solutions behaved differently from that of intact virus, and there was also a difference in behaviour on high-speed centrifugation. Unfortunately, the two types of preparation were not compared after treatment at the same infective titre. Nevertheless it seems fair to conclude that the infectivity of the ribonucleic-acid solution is not due to intact virus particles but to viral nucleic acid.

The next question was whether the nucleic acid was present in the cells as such and was extracted before being built up into virus particles, or whether it had been extracted from mature virus particles. COLTER et al. answered this question by treating cell homogenates infected with Mengo virus with ribonuclease before carrying out the phenol extraction. The ribonuclease treatment had no effect on the amount of ribonucleic acid subsequently extractable from these preparations, and COLTER et al. conclude that the infective ribonucleic acid was extracted from the Mengo virus particles. It should be possible to confirm this conclusion by experiments on purified virus preparations, as has been done with tobacco-mosaic virus. Meanwhile, it seems that for a number of small animal viruses the information required to synthesise whole virus particles may reside in the viral nucleic acid alone, and on present theories of nucleic-acid structure this implies that the code for making particles of these viruses is determined by the particular arrangement of their nucleotides on the nucleic-acid chain. The protein overcoat of the virus is presumably designed mainly to protect the nucleic acid in an unfriendly world, although from the point of view of the viral host the protein may have other roles. But more and more attention is being devoted to understanding nucleic-acid synthesis, with a view to interrupting it where it is becoming inconvenient to man.

19. Dunlop, D. M. *Brit. med. J.* 1954, ii, 383.
20. Joslin, E. P., Root, H. F., White, P., Marble, A. The Treatment of Diabetes Mellitus; p. 657. London, 1952.
21. See *Lancet*, 1956, i, 490.
22. Gierer, A., Schramm, G. *Nature, Lond.* 1956, **177**, 702.
23. Colter, J. S., Bird, H. H., Brown, R. A. *ibid.* 1957, **179**, 859.
24. Wecker, E., Schäfer, W. *Z. Naturforsch.* 1957, **12**, 415.
25. Colter, J. A., Bird, H. H., Moyer, A. W., Brown, R. A. *Virology*, 1957, **4**, 522.

The Open Door

DURING the past few years more and more doors have been unlocked in our mental hospitals. So far, in setting them ajar, the emphasis has been on egress rather than ingress; but an open door should invite patients to enter as well as to leave. The Royal Commission on the Law relating to Mental Illness and Mental Deficiency recognised the importance of easy two-way traffic, and many of their most important recommendations were based on the principle that the patient who is mentally ill or mentally defective should be able to get the shelter and support of hospitals and social services with as little formality as the patient who is physically ill. Many of their recommendations will have to await legislation, but it is encouraging that the Minister of Health, in consultation with the Board of Control, is acting without delay on their proposals for changes in the procedure for admitting patients to mental-deficiency hospitals.

It is appropriate that a beginning should be made in these hospitals, for hitherto their routine procedures for admission have been more rigid than in hospitals for the mentally ill. Only exceptionally have patients been admitted without certification, and the "voluntary" procedure has not been applicable. Now they will lead the way, for, thanks to the convenient wording of the present Mental Deficiency Acts, certification is not a legal necessity for these patients, and can, save exceptionally, be allowed to lapse. Past official disfavour of informal admission, as the Royal Commission pointed out, was based on "considerations of administrative policy rather than law". The Minister has accordingly recommended mental-deficiency hospitals to admit patients who are willing without certification, and to

review their present patients with a view to ending compulsory powers over them where possible.[1] Local authorities have similarly been asked to review patients who are subject to a guardianship order.[2]

The new procedure means that it will no longer be possible to detain these patients in hospital if they want to leave. But in fact the change will, it is hoped, be more apparent in a new climate of opinion than in an exodus of patients. In the present overcrowded state of the mental-deficiency hospitals, medical need must still be the deciding factor in obtaining admission; but patients—and, perhaps even more important, the parents of patients—will accept help more readily and more happily if they feel that they are not at the same time surrendering their rights. Some patients, especially at first, will wish to leave the hospital against advice. In these circumstances the Minister advises that they, and their relatives, should be given the opportunity to discuss the matter fully with the hospital doctor. A patient who persists in his determination to leave should normally be allowed to do so, though exceptionally in his own interests or for the protection of the public he might have to be detained by certification.

One of the most forward-looking parts of the Royal Commission's report was their concern that the mentally ill and the mentally defective should be offered more help and support as part of the community rather than as isolates in hospitals and institutions. Small hostels and welfare services would, the report suggested, make it possible for many of them to share a normal, if sheltered, life with their relatives and friends. The Royal Commission saw the local authorities as the natural administrators of such community services; and undoubtedly these patients offer the public-health doctor a big opportunity in the exercise of preventive medicine and aftercare. This work can only be effective if the mental hospitals and the local authorities draw together. The Nottingham scheme[3] and the Worthing experiment[4] illustrate some of the possibilities, and the new procedures may well provide more. For instance, in his circular the Minister asks that it should become a routine practice for the hospital to notify the local authority when a patient returns to his home. The Minister also points out that the hospital will be even more dependent on the local authority for information about the patient's background and family and for his supervision when he leaves hospital.

Everyone will be glad that it has proved possible to implement so promptly this part of the Royal Commission's report. We trust that the rest need not wait too long on legislation's more deliberate pace.

1. H.M.(58)5.
2. Min. Hlth Circular 2/58.
3. Macmillan, D. *Lancet*, 1956, ii, 1094.
4. Carse, J., Panton, N., Watt, A. *ibid.* Jan. 4, 1958, p. 39.

Annotations

HYPERTENSION AND UNILATERAL RENAL DISEASE

HYPERTENSION may be associated with unilateral renal disease, and in many recorded instances a sustained reduction of blood-pressure has followed selective nephrectomy; but it is often difficult to decide on the significance of kidney disease, if present, and, consequently, on the chances of benefit from operative treatment. Experimental evidence, based on the induction of hypertension by partial occlusion of a renal artery and on the demonstration of the renal pressor system, suggests that true "renal" hypertension depends essentially on a vascular lesion. This is supported clinically by the observed occurrence of hypertension in cases of renal ischæmia due either to infarction or to stenosing conditions of the renal artery and its main branches. Research in cases of hypertension of suspected renal origin has, therefore, been directed towards discovering specific vascular lesions which on identification might afford an indication for effective surgical treatment. Poutasse and Dustan[1] have submitted 109 selected hypertensive patients to renal angiography, accomplished by means of translumbar aortography.

They emphasise that aortography should be used not as a routine investigation but only in accordance with certain well-defined indications: firstly, in all cases (regardless of age or the duration of the hypertension) where there is unexplained disparity in the size or function of the kidneys on excretion urography; secondly, in all young patients in whom no other cause can be demonstrated; thirdly, where malignant hypertension develops suddenly in previously somewhat hypertensive elderly patients; and, finally, where there is rapid exacerbation of essential hypertension at any age, particularly if the patient has renal symptoms. Of the 104 patients selected according to these indications, 30 were found to have unilateral or bilateral obstructive lesions of the renal artery, which in many instances were considered to be the primary cause of the hypertension. Most of the lesions were arteriosclerotic plaques causing narrowing of the lumen and associated in some cases with post-stenotic aneurysmal dilatation of the more distal part of the vessel. 19 of these patients were subjected to operation (usually nephrectomy) with gratifying results—the blood-pressure reverting to normal in 5 out of 7 cases followed up for over a year, and in 6 out of 10 observed for shorter periods. Of the 2 patients who died, 1 had been subjected to arterial grafting and the other to attempted endarterectomy.

Discussing the significance of renal arterial disease, Poutasse and Dustan refer both to its potential danger as a cause of hypertension and to the inherent risk of spontaneous rupture of a post-stenotic aneurysm. But in deciding whether to embark on surgical treatment, it should be remembered that only a small proportion of hypertensives have vascular disease restricted to, or predominantly affecting, one kidney, and that local arterial rupture is rare. Unless, therefore, the radiographic evidence is particularly convincing, conservative management with anti-pressor drugs may seem more promising. Nevertheless, Poutasse and Dustan rightly claim that operation is indicated in carefully chosen cases, and they look forward to the time when selection will be aided by detection of renal pressor substances.

1. Poutasse, E. F., Dustan, H. P. *J. Amer. med. Ass.* 1957, **165**, 1521.

STATISTICS OF SMOKING

THERE is mounting evidence of an association between smoking and malignant and other disease, and there is a real need for dispassionate assessment of the magnitude of this association and the realities of any underlying causal mechanisms. The long-term interest of the tobacco manufacturers lies in a free exchange of information between scientific workers concerned with this vital problem; and the publication of a volume of statistics on tobacco consumption [1] by the Tobacco Manufacturers' Standing Committee is a welcome token of their recognition of this viewpoint.

Mr. G. F. Todd, statistical adviser to the committee, has produced a most useful volume by collecting from various sources information on the tobacco-consumption habits of different populations both in this country and elsewhere. Details are given of time trends in consumption by the type of tobacco used (whether cigars, cigarettes, snuff, or pipes) in different countries. From sample surveys done by market-research firms in the United Kingdom, data have accrued on the frequency and type of smoking according to age, sex, job, and place of residence. In general, these findings are in line with expectation. In truly rural areas, the average daily cigarette consumption of 8·8 per man is less than the 11·3 of the county boroughs; but the lack of information on sampling procedures and size of samples makes it difficult to judge the significance of these differences. Some of the other assumptions involved in calculating average consumptions are more explicitly stated in the editorial notes. Despite these limitations, the general pattern of the material—e.g., on the age-sex trends in smoking habits—is clear enough, and this summary should prove useful in further epidemiological inquiries.

SPEEDING THE PATIENTS

YEAR by year the Ministry of Health publishes an analysis,[2] running into 47 columns, of the cost of our hospitals. The hospitals are grouped, according to their function and character, under such headings as acute, mainly acute, long-stay, isolation, and mental-illness. The analysis aims at providing figures to show the net weekly cost of maintaining a patient. To this end the main items of expenditure are divided into two groups—those which tend to vary directly with the number of patients, and those which tend to remain unaltered by the number of beds occupied.

Fallacies in the subdivisions have been pointed out in recent years, and these are recognised in the report. The main distorting influence is still the assessment of outpatient expenditure. This is estimated on the basis that five outpatient attendances cost the same as one inpatient day. However in future more accurate information about the real cost of outpatients will be provided, for last April a start was made in the introduction of a full departmental costing system in some 200 hospitals which have an annual expenditure of £150,000 or more. The figures which this new procedure will offer when the change-over is completed are awaited with interest.

During 1956-57 the weekly cost of maintaining a patient in an acute hospital was £19 11*s.*, compared with £17 15*s.* in 1955–56. In special hospitals the cost ranged from £8 13*s.* in long-stay hospitals to £23 4*s.* 6*d.* in isolation hospitals. These figures had been adjusted (or distorted) to allow for expenditure on outpatients. Last year for the first time figures were also given for the cost per patient treated in hospital. These provide a telling comparison for hospitals doing the same kind of work, and are perhaps the most important part of the analysis, for they give a clue to where improvements might be made in the hospital service. For 1956–57 the average cost per patient treated in "all acute hospitals" was £40 14*s.*, compared with £37 12*s.* in 1955–56. Generally speaking the cost per patient per week differs only slightly in similar hospitals in the same region, whereas the cost per patient often varies greatly. The difference is due not to the percentage bed-occupancy but to the speed of the turnover. Many hospitals have found that by careful administration the turnover can be increased without detriment to the patient's welfare, and indeed often to his advantage thanks to earlier ambulation and prompter investigations. Scrutiny of the figures suggests that in many hospitals there is still scope for quickening the pace of discharges and admissions.

A CANCER FALLACY

THE latest report of the National Cancer Registration Scheme [1] contains much interesting information on treatment and survival; but it also contains some surprising statements about the incidence of the disease. They seem to arise from the belief that the liability of an individual to develop cancer at various ages can be deduced from a contemporary set of age-specific incidence or death rates. This fallacy is well illustrated in the section on lung cancer. In this disease, as is well known, the age-distribution of a large group of patients shows at present a peak in the 7th decade; and the age-specific death-rate is also lower in the 8th decade than the 7th. From this the Registrar-General deduces that cancer of the lung is "a disease of middle adult life, the risk of contracting it diminishing in the older age groups"; and later that the mortality-rates "justify the conclusion that in England and Wales the risk for women of contracting lung cancer does not increase after the age of 70 but much more probably falls, while after the age of 65 the risk for men certainly falls."

These statements are not supported by the available evidence. It is true that the death-rate of people over 70 who die of lung cancer is smaller than the death-rate of those aged 60 to 69; and the risk of death from this cause is greater at present for an individual aged 65 than for one aged 75. But it cannot be inferred from this that the risk for the older individual was greater ten years ago or that the risk for the younger will be less in ten years' time. The changing incidence with advancing age can be studied only by following the experience of a group of individuals through their successive ages. In practice, this is done by the method of cohort analysis. Using this technique Korteweg [2] in 1951 and Case [3] in 1956 showed that the risk of death from lung cancer increases throughout life. There is, in fact, no falling off after middle life. Thus, the death-rate among those now 75 is higher than it was ten years ago among the group then aged 65, of whom they are the survivors. Those aged 65 at present are suffering a

1. Tobacco Manufacturers' Standing Committee. Research Papers no. 1: Statistics of Smoking, edited by G. F. Todd. Published by the committee, 6, Bruton Street, London, W.1.
2. National Health Service Hospital Costing Returns, March 31, 1957. H.M. Stationery Office. £1 2*s.* 6*d.*

1. Supplement on Cancer. Registrar-General's Statistical Review of England and Wales for the Year 1952. H.M. Stationery Office, 1957.
2. Korteweg, R. *Brit. J. Cancer*, 1951, **5**, 21.
3. Case, R. A. M. *Brit. J. prev. soc. Med.* 1956, **10**, 172.

higher rate than were people of the same age ten years ago.

The " fall " of death-rate from lung cancer in old age is, therefore, an expression not of diminished individual risk in old people but of increased risk in the younger ones. The current death-rate among an age-group is the latest term in a series of rates stretching back year by year to the birth of all individuals in the group; and the rates may vary with, among other things, the changing environment. The individuals taking part in a contemporary age-specific rate are not the same as those in any other contemporary rate, nor can they have been subjected to exactly the same environment. In the case of lung cancer some of the relevant factors in the environment are known to have changed considerably, for the practice of cigarette-smoking increased rapidly in the early part of the century. Thus, those now 65 have been more exposed to this hazard than were those who were 65 ten years ago; and the impact of the disease on them is correspondingly greater. The application of the method of cohort analysis to cancer mortality was clearly described recently by Case,[4] who emphasised its great value as a historical or narrative technique for displaying the changing patterns of mortality.

OPERATING-THEATRES

PERHAPS the most significant change in operating-room mechanics in the past twenty years has been, in a sense, a return to Listerism. Antisepsis inculcated an aggressive approach to organisms, which were attacked even in the air; this attitude changed with the advent of asepsis to one rather of peaceful coexistence; and conveniently the hazard of airborne organisms in theatres was almost forgotten, for how could air be sterilised? Yet some remained vigilant. Hart [5] showed that hæmolytic *Staphylococcus aureus* was the predominant organism in 90% of unexplained wound infections; that this organism was not to be found in recently laundered materials; that the staphylococcus obtained from the skin and sweat of staff and patients was usually *Staph. albus*, almost never hæmolytic *Staph. aureus*; and that *Staph. aureus* could invariably be obtained from the air of the operating-room. Air contamination was worse in winter, and the source appeared to be the nasopharynges of those working in the theatre. After introduction of air sterilisation by ultraviolet irradiation, wound infection fell to a hundredth of its previous level in thoracoplasties and mastectomies. In this country Cairns [6] was concerned about airborne infection of neurosurgical cases from similar sources. But the source contaminating the air pool does not always lie within the noses of those working in the theatre: Sevitt [7] found that two cases of tetanus were due to introduction into the theatre of spores from plaster hair being used for building repairs nearby; he indicted the ventilation system, and yet had the discouraging experience four years later of having to report gas-gangrene infection due to the still faulty system. [8]

Except for a few hospitals equipped with the plenum heating system, the standard ventilation system during half a century of asepsis has been on the exhaust principle: in order to get rid of steam from the sterilisers and to provide comfortable working conditions for surgeon and staff, air is changed by extraction. The possibility that organisms from outside the theatre might thus be sucked in was long ignored; and so the great majority of our hospitals today, even those built just before the late war, have to face a new era of infection with dangerous equipment. A bulletin just published by the Ministry of Health,[9] the first of a series to help those concerned with designing and planning hospitals, is particularly welcome since it recognises the *volte-face*—the return to the attack on airborne organisms. Both ultraviolet radiation and aerosols are dismissed as means of air sterilisation. Instead it is recommended that positive-pressure systems of ventilation be installed in all new theatres so that organisms shed within the theatre are blown out, while dust and organisms outside are driven away from its precincts. But installing a positive-pressure system cannot alone ensure security, [10] since the current of air may disturb dust lying on the floor; its direction must be controlled in the light of smoke tests. Moreover vertical shafts connecting suites of theatres tend to develop into extraction systems owing to a Venturi effect as warm air rises up them, thus nullifying the attempt at positive pressure—yet another reason for constructing theatre suites in horizontal, as the bulletin recommends. There is one quite important omission. Sometimes people outside the theatre—usually members of the medical staff—need to speak to the surgeon while he is operating. This is best done by means of microphone and speaker circuits, which obviate disturbance due to movement in and out of the theatre—movement which Bourdillon et al.[11] have shown to be followed by an increase in airborne organisms.

One innovation in the layout of the theatre suite is the inclusion of a recovery room—an admirable recommendation which may nevertheless evoke controversy. All would agree on the need for a site to be set aside where the anæsthetist may readily reach the patient who has just been operated on, while still conducting the rest of the operating-list; a third of all anæsthetic deaths occur within half an hour of the end of the operation, and these are almost invariably due to obstruction of the airway. But some would remove the recovery room from the theatre and place it, as a recovery ward, immediately adjacent [12]; they insist on the need for such a ward not only for immediate postanæsthetic care but for the first two or three days after operation when the patient can (it is claimed) be better treated in this special ward and the staffing of the ward he has come from can be correspondingly lightened. Recovery wards are the vogue in the New World, where they doubtless help to reduce the handicap of the scarcity (even greater there than here) of experienced nurses. Where this scarcity is not so great, the other practical advantages of concentrating postoperative patients in a single ward must be set against the disadvantage of requiring them to enter a new environment at a time of special stress. Any patient coming into hospital is quite suddenly alone, with human contacts—those stabilising factors in life—severed. Accordingly he must set about establishing new contacts, with the staff and his fellow patients. To the surgical patient the new contacts that he establishes before operation are especially valuable in the first few postoperative days.

4. Case, R. A. M. *Brit. J. prev. soc. Med.* 1956, **10**, 159.
5. Hart, D. *J. Amer. med. Ass.* 1941, **117**, 1610.
6. Cairns, H. *Lancet*, 1939, i, 1196.
7. Sevitt, S. *ibid.* 1949, ii, 1075.
8. *ibid.* 1953, ii, 1121.
9. Hospital Building Bulletin, no. 1: Operating Theatre Suites. H.M. Stationery Office. Pp. 76. 9*s*.
10. Paterson Ross, J. *Brit. med. J.* 1956, i, 702.
11. Bourdillon, R. B., McFarlane, A. M., Thomas, J. C. *Spec. Rep. Ser. Med. Res. Coun. Lond.* 1948, no. 262, p. 241.
12. See *Lancet*, Jan. 11, 1958, p. 91.

Public Health

PROBLEM FAMILIES

A London Survey

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THE Minister of Health in 1954 encouraged local health authorities to develop their work in preventing the break-up of families, and in particular to see what they could do to break the vicious circle in which problem families tend to reproduce themselves in the next generation—at an expense to the community out of all proportion to their numbers. He suggested that this work might be done through the redeployment of existing health visitors rather than by an increase in their number, but the employment of a trained social worker might be useful.

Our first task in London was to ascertain how many families needed help on the lines suggested, and to estimate how many needed intensive care which could be undertaken only by a case-worker with a small case-load or by a combination of social case-workers. With my colleagues in the education and welfare departments a survey was made covering all families with a child or children under the age of 15. My department investigated the families in which there was a child under 5 living at home; the education department investigated those in which all the children were older; and the welfare department dealt with families in homeless-family units or halfway houses. So far as numbers are concerned, therefore, the data given are complete, but the detail relates only to the families with which my department was primarily concerned.

Planning

Families may be classified broadly into five groups :

1. Above normal visiting standard.
2. Socially sound.
3. Families with difficulties.
4. Potential problem families.
5. Hard-core problem families.

The survey was concerned with the selection of these two last groups.

Potential problem families may be defined as " those in which there are early signs of failure . . . which may lead to disruption of normal home life with consequent risk to . . . the children ", and hard-core problem families as " those which are unable, by their own efforts to raise themselves from the state into which they have fallen or to take advantage of the social services of which they are in need ". There are, however, many other definitions, and it was felt that any inquiry based solely on qualitative criteria would lead to subjective assessments by health visitors and others, from which no valid conclusions could be drawn. Accordingly the factors which were likely to be found in such families were listed and points allocated to each factor: this provisional pointing system was tested by application to the circumstances of a number of families and modified in the light of the tests. The factors and points awarded them were chosen arbitrarily, but they provide a clear and uniform basis for a survey; moreover they enable comparable assessments to be made in later years. A maximum of five discretionary points was allowed for imponderables.

The list of factors and the points awarded are set out below; for brevity certain detail has been omitted, such as guidance on the interpretation of the terms drinking, gambling, and promiscuity as factors, and the period over which they should have been operative.

FACTORS LIKELY TO BE FOUND IN PROBLEM FAMILIES

1. *In a parent*
   - (a) Low intelligence or mental deficiency.
   - (b) Mental illness.
   - (c) Physical handicap or illness which prevents work or permits of light work only—e.g., tuberculosis, heart-disease.
   - (d) Long-continued or recurrent unemployment of main wage-earner from other causes than physical handicap or illness.
   - (e) Excessive drinking.
   - (f) Excessive gambling.
   - (g) Sexual promiscuity.
   - (h) Serving, or has served, a prison sentence.
   - (i) Suspected cruelty to or neglect of children.
   - (j) Known cruelty to or neglect of children.
2. *Other parental shortcomings*
   - (a) Persistent quarrelling.
   - (b) Failure to call doctor for major illness.
   - (c) Leaving young children unattended.
3. *In a child*
   - (a) Repeated hospitalisation of one or more children for gastroenteritis or respiratory disease, or two or more children for minor accidents.
   - (b) Persistent truancy.
   - (c) Juvenile delinquency (court cases only).
   - (d) Attendance at child guidance clinic.
   - (e) Under Probation Officer or committed to care by a court.
4. *Housing*
   - (a) Statutory overcrowding.
   - (b) Living in intolerable conditions (while not overcrowded) because of either lack of amenities such as piped water, damp or insanitary conditions, and/or enmity of other occupants of dwelling.
5. *Poverty and mismanagement*
   - (a) Chronic family debt.
   - (b) Lack of minimal necessities of furniture and bedding.
   - (c) Inadequate and irregular meals.
   - (d) Domestic filth and disorder.
   - (e) Wilful damage to property.
   - (f) Lack of, or inadequately maintained, clothing of children.
6. *General*
   - (a) Unnecessary crowding at night.
   - (b) Gross personal uncleanliness.
   - (c) Failure to take advantage of necessary help and service proffered.
   - (d) Child or children taken into care other than as the result of court action, and who are frequently taken into or out of care.

Allocation of Points to Factors

1. 1 point was allotted for the existence, whether one or more persons was affected, of each factor in the list, except in section 1, where for items (*a*) to (*i*) the pointing was:

For one parent—1 point
For both parents or the sole parent—3 points

and for item (*j*) the pointing was:

For one parent—$1^1/_2$ points
For both parents or the sole parent—4 points

2. Additional points or fractions of points, up to a maximum of 5, could be added by the reviewing officer to deal with imponderable factors not listed—e.g., persistent sickness of children; mental or physical cruelty of one parent to another; racial differences between parents; spasmodic reappearances of deserted, divorced or separated parent (which upsets stability); a combination of items which do not of themselves merit points, such as domestic disorder (without filth), poverty with spasmodic debt, large numbers of children under 5, and inadequate (but not irregular) meals.

3. The maximum pointing was 56, and for the purposes of classifying the families assessed the following arbitrary values were used:

Hard-core problem family—11 points or more.
Potential problem family—5–10 points inclusive.

The differing social conditions in various parts of the county, and the lack of any real knowledge of the numbers and location of problem families, made it necessary to have a complete survey rather than a sample.

Operation

The county comprises nine divisions, each administered by a divisional medical officer. In each the health visitors were asked to make a provisional selection of potential and hard-core families from their total case-load (in London a case-paper is made out for every child born to a resident and is kept in a family folder at the local clinic). Family case-histories, selected by the health visitors and supplemented by discussion, were considered by the divisional nursing officers in each division (who were appointed reviewing officers) to assess the factors and to grade the families. Health visitors made a note of the time actually spent for a period of four

weeks on the families finally selected. Finally a central team (Principal Medical Officer (Maternity and Child Welfare), Statistician, and Chief Nursing Officer) visited a number of centres in the divisions and interviewed the health visitors. Ten centres were visited and 39 health visitors were interviewed. The centres were chosen to represent a cross-section of the London population as regards social class.

The relationship of health visitors with other field workers of both voluntary and statutory bodies called in to assist the family, the attitude of the family towards advice and help, and the limitations imposed by their willingness or ability to accept advice, were all taken into consideration in forming an estimate of the amount of time which should be spent on these families.

Numbers

Families with a Child under 5

Table I sets out the number of families surveyed by the public health department. The figures shown tend to be an underestimate, because constant immigration means that at any given moment there will be new families in the county whose circumstances are not fully, if at all, known; moreover, with the turnover of health visitors, there were some who, at the time of the assessment, could judge only from case papers, which, however well kept, are no real substitute for personal knowledge of the family.

The difference between the average and maximum numbers of problem families in the care of a full-time health visitor confirmed the impression that problem families tend to be grouped in small areas.

Also they tend to move about: for example, of 30 families in the case-load of one health visitor, 6 had moved out of her district in three months. They may also move in and out of the various categories as their circumstances change: for example, in one division there were at the time of the survey 314 problem families in all, whereas six months later the total had fallen to 303. The net fall of 11 families was made up of a much larger fall in the number of potential problem families offset by a rise in the number of hard-core problem families.

TABLE I—NUMBERS AND PERCENTAGES OF PROBLEM FAMILIES IN FAMILIES WITH CHILD UNDER 5

No. of families surveyed	with children under 5 only	103,172
	with schoolchildren also	68,699
	total	171,871
No. of potential problem families	among those with children under 5 only	569
	among those with school-children also	1225
	total	1794
No. of hard-core problem families	among those with children under 5 only	146
	among those with school-children also	516
	total	662
Percentage of potential problem families of	those with children under 5 only	0·55
	those with schoolchildren also	1·78
	all families surveyed	1·04
Percentage of hard-core problem families of	those with children under 5 only	0·14
	those with schoolchildren also	0·75
	all families surveyed	0·39
Percentage of problem families of	those with children under 5 only	0·69
	those with schoolchildren also	2·53
	all families surveyed	1·43
Average no. of problem families in the care of a full-time health visitor	potential problem families	4
	hard-core problem families	2
	all problem families	6
Maximum no. of problem families in the care of a full-time health visitor	potential problem families	27
	hard-core problem families	18
	all problem families	33

The 171,871 families surveyed which have a child or children under 5 comprises, as far as can be estimated, virtually the total that exists.

Our belief that in this respect the survey was almost complete is supported by the results of an earlier investigation in which the number of children under 5 with whom the health visitors were in contact was compared with the Registrar General's population estimate, and with a current estimate of the number of families of differing compositions, taking into account migration and birth and death rates. The number of problem families ascertained is unlikely to be too few, since these families are characterised by their demands, voluntary and involuntary, on the social services.

The rates for the two categories of problem family combined ranged from 0·52% in division 7 (Camberwell and Lewisham) to 2·28% in division 5 (Bethnal Green, City, Poplar, and Stepney): the county average was 1·43%. The estimated percentage of problem families, based on an investigation of 1000 families in Newcastle upon Tyne, was 2, but, as the authors of the report [1] make clear, " the difficulties of measurement and the way the families were selected should be borne in mind ". In a large urban county such as London, which contains within its boundaries such widely differing types of locality, larger interdivisional differences might have been expected; but in fact the percentage incidence of problem families in the remaining seven divisions ranges from 1·04 to 1·80.

The lowest figure merited further investigation. Possibly it was attributable to the stable staffing in the division concerned; moreover, for a long period the senior nurses had given positive direction to the work with these families, and home helps had been used to assist in more intensive efforts in the homes.

As might be expected, there were fewer hard-core problem families than potential problem families—662 as opposed to 1794; and in both the potential and hard-core groups there were fewer families among those with children under 5 only than families with children under and over 5—in total 715 as opposed to 1741—although there were only 69,000 mixed families compared with the 103,000 families with children under 5. (Despite fluctuations in numbers these findings are consistent among all divisions.) Among families with a child or children under 5 years of age the percentage incidence of potential and hard-core problem families was 0·55 and 0·14 respectively; among families with children both under and over school age the corresponding percentages were 1·78 for potential and 0·75 for hard-core problem families. It is assumed that the reason for the higher percentages of problem families among the " mixed " ones is that they are probably larger and/or poorer so that the mother cannot cope—there seems to be a limit to the difficulties with which a stable but dull parent can compete, after which one further adversity will produce a complete breakdown in domestic management.

Families with no Children under 5

Among the families cared for through the education care-committee organisation were 427 potential problem families and 99 hard-core problem families.

It is proper to note that an attempt had to be made by the care-committee organisers to award points for the various factors as revealed by the case-histories in the office files, and, whereas the families where children had been reported to the

1. Spence, J., Walton, W. S., Miller, F. J. W., Court, S. D. H. A Thousand Families in Newcastle upon Tyne. London, 1954.

TABLE II—TOTAL NUMBERS OF POTENTIAL AND HARD-CORE PROBLEM FAMILIES

Problem family	Children under 5 only	Children under and over 5	Children all over 5	In welfare homes	Total
Potential	569	1225	427	18	2239
Hard-core	146	516	99	22	783
Total	715	1741	526	40	3022

National Society for the Prevention of Cruelty to Children (N.S.P.C.C.) or the Education Officer's Problem Case Conferences were reasonably well documented, full data were not usually available in other cases. The assessment of families into the two categories was therefore somewhat subjective.

The percentages, based on an estimated number of families, were 0·21 for potential and 0·05 for hard-core problem families. The rate for both (0·26) is about two-fifths of that for families with children under 5 years only and a tenth of that for families with children over 5 also.

As the families reported on by the care organisers were not increasing and the children were all benefiting from the school and school-health services it might have been expected that the percentage would be below that for the mixed families. The numbers reported may, because of the reliance mainly on case papers, be an understatement—i.e., in some households in which the children are all of school age—the mothers' responsibilities are lessened and the more obvious evidence of neglect may tend to disappear, but other manifestations, such as truancy or juvenile delinquency are apt to take their place, while such factors as low intelligence or housing difficulties remain.

Families in Homeless Family Units and Short-stay Accommodation

Within this select group of families, the wardens of the homeless family units chose those which appeared to come within the definition of potential and hard-core problem families. There were, in a total of 645 homeless families, 18 thought to be potential and 22 hard-core problem families. In terms of percentages, therefore, potential problem families amounted to 2·8 of the total,

TABLE III—PERCENTAGE INCIDENCE OF FACTORS AMONG ABOUT 1000 PROBLEM FAMILIES WITH A CHILD OR CHILDREN UNDER 5

Factor	Potential problem families	Hard-core problem families	All problem families
Parent:			
Low intelligence	42·2	67·3	50·9
Mental illness	16·5	13·8	15·6
Illness or handicap	18·2	18·1	18·1
Unemployment	26·5	46·7	33·5
Excessive drinking	13·8	25·5	17·8
Excessive gambling	8·3	14·3	10·4
Sexual promiscuity	19·1	32·1	23·6
Prison sentence	12·8	22·6	16·3
Suspected cruelty (or neglect) to children	21·1	31·2	24·6
Known cruelty(or neglect)to children	15·9	45·8	26·3
Parental shortcomings:			
Quarrelling	40·5	51·9	44·5
Failure to call doctor	2·8	12·0	6·0
Leaving children alone	13·8	37·0	21·8
Child:			
Repeated admission to hospital	18·8	26·1	21·3
Persistent truancy	4·3	10·3	6·4
Juvenile delinquency	20·5	11·2	7·3
Attendance at child-guidance clinic	4.3	5·2	4·6
Under probation officer, &c.	8·7	15·8	11·2
Housing:			
Overcrowding	28·4	35·5	30·9
Intolerable conditions	31·5	44·1	35·9
Mismanagement:			
Chronic debt	24·6	51·9	34·1
Lack of furniture	25·4	54·2	35·4
Inadequate meals	38·2	70·5	49·5
Filth and disorder	32·1	59·3	41·6
Wilful damage	5·2	20·1	10·4
Children inadequately clothed	27·4	60·7	39·0
General:			
Unnecessary crowding	9·6	20·6	13·5
Uncleanliness	16·5	41·5	25·2
Help refused or abused	30·4	51·0	37·6
Children taken into care	11·0	21·5	14·7
Imponderable factors	76·1	59·3	70·3

hard-core families to 3·4, and the two together 6·2. These figures are obviously not comparable with those obtained by more exact standards, but the incidence of problem families so selected was slightly more than four times as high as that ascertained in the public-health department of families living in their own home.

Total Numbers

From all departments, there was reported a total of 3022 families, 2456 from those with a child or children under school age, 526 from those with children of school age only and 40 in welfare establishments (table II).

In five recent surveys in other parts of the country,[2] the figures of incidence range from 1·2 to 6·2 problem families per 1000 total families. The bases of the various inquiries were not uniform, and the figures should be treated with some reserve. There are in London some 1,100,000 families, but only about 400,000 of them have a child or children under 16. The London total works out at about 2·75 problem families per 1000 total families, though, as will be apparent from what has been already said, the various components of the total number were not all arrived at in quite the same way, and more reliance can therefore be placed on some than on others.

Ætiological Factors

After the survey was well advanced it was decided to analyse the ætiological factors in problem families in four divisions. The number of problem families reviewed was about 1000 and the factors assessed are shown in table III.

There were, as might be expected, a number of differences between the divisions in the incidence of such factors as long unemployment or lack of amenities. The table again separates the families into the potential and hard-core categories: a further subdivision was made into those with all children under five years of age and the mixed families, but this has been omitted from the table, largely because nothing of importance was revealed.

The salient features are, first, the high amount of emotional instability—if it be accepted that excessive drinking, excessive gambling, sexual promiscuity, and persistent quarrelling are symptomatic of instability. 54·5% of potential problem families and 71·6% of hard-core problem families reveal emotional instability by one such symptom. The second feature is the high incidence of low intelligence or mental deficiency: 42·2% of the potential problem families and 67·3% of the hard-core. (It is admitted that low intelligence has not been defined and is therefore a matter of judgment of the individual health visitor.)

It is a matter for conjecture whether anything substantial can be done through the normal health services for the families in which emotional instability is combined with low intelligence. This group accounts for 19·1% of the potential problem families and 45·8% of the hard-core; but instability, as evidenced by the four symptoms chosen, is in fact combined with normal intelligence or above in no less than 35·4% of the potential problem families and 25·8% of the hard-core.

The third feature is the proportion of families in which there was known or suspected cruelty or neglect. Allowing for overlapping, in that some families had both, say, known neglect and suspected cruelty, the percentages were 34·6 in the potential problem families and 77·1 in the hard-core. Within this group there are families in which neglect may amount to cruelty, yet the family remains an entity because there is affection between parents and

2. Blacker, C. P. Problem Families: Five Inquiries. London, 1952.

TABLE IV—TIME SPENT BY HEALTH VISITORS ON PROBLEM FAMILIES WITH A CHILD OR CHILDREN UNDER 5

	Minutes per week per family			Total hours per week
	Average	Maximum	Minimum	
Potential problem families ..	20	270	0	606
Hard-core problem families ..	28	210	0	308

children. This is not, of course, a matter which affects local authorities alone—many of the families being under the scrutiny of the N.S.P.C.C. or the probation service. Nevertheless the figures are profoundly disturbing.

The fourth feature is the environment: housing; there were overcrowding or intolerable conditions (including enmity of neighbours), or both, in 44·3% of potential problem families and 60·2% of the hard-core, allowing for overlapping. Whether bad housing dragged the family down, or whether the unsatisfactory family inevitably gravitated to bad conditions is a matter which can be decided only after careful sifting of the individual family circumstances.

Finally, 30·4% of the potential problem families and not less than 51% of the hard-core failed to take advantage of the help and services proffered.

Time Spent by Health Visitors

Table IV shows the average time spent per problem family per week by health visitors, together with maxima and minima.

The county averages were twenty minutes a week for a potential problem family and twenty-eight minutes for a hard-core one. In every division of the county more time was spent on the hard-core than on the potential problem families. The maximum times are almost without exception the result of a crisis in one or more of the families concerned—such as a mother temporarily deserting her children, an economic crisis, infidelity, a child being in trouble for truancy, assault or theft, or illness in a parent—which has caused the health visitor to devote perhaps the whole of her time for several days to solving the particular issue.

It may seem surprising that the minimum times are nil, but this is due to such causes as the absence of the family (hop-picking), the temporary stability of the family, or the occasional unwillingness to accept the health visitor. The fact that a visit would be unwelcome does not mean that the family is neglected. Quite apart from information garnered from other social workers, health visitors learn a great deal about their families as they go about their district which is not reflected in the times recorded: they may meet the mother in the street or the children at school; they see friends, neighbours, and relations; and some mothers will seek out the visitor at the centre when they are in trouble. Another reason for low times spent is that, as was shown in table I, a few health visitors had to deal with a concentration of problem families—a concentration too great in some cases for them to carry adequately. The information revealed by the survey has led to a certain amount of " load spreading ". It is impossible wholly to equalise this particular burden because of the location of the families and the demand of other duties undertaken by health visitors. Again health visitors do not work in isolation: almost always there were two or more social workers dealing with a problem family, and if they are working together responsibility is shared and visits by either one become less frequent.

A decision of the average amount of time that could usefully be spent on families in the two categories was a matter of some complexity. There were variations in family customs, outlook, size, age, structure, housing, and so on, as well as constantly changing family circumstances. In some cases Family Service Units are actively engaged in work with problem families as well as the Family Welfare Association, N.S.P.C.C., Area Children's Officers, &c.: a service of specially trained home helps has recently been introduced to work with the health visitors. Moreover, the practice has been developed of health visitors working in teams, which has led to a pooling of ideas, abilities, and experience (not least in the linguistic and religious fields), and has enabled families to be transferred from one health visitor, with whom they may no longer be en rapport, to a colleague on the team: this teamwork has provided for an easier transference of care in times of staff sickness and a means of overcoming the feeling of staleness that overtakes at times even the most enthusiastic of workers. In addition, where the father was the stable element in the household, the health visitor has made contact with him in the evenings or at weekends: the need for a male worker has been apparent in cases where the father has been recalcitrant or sexual problems have been involved, and, in these circumstances, health visitors have sought the aid of male workers of the N.S.P.C.C. or National Assistance Board. The general practitioner can be immensely helpful when an authoritative approach to the father is required.

There is a wide range of times about the averages (table IV), and the maximum times are themselves averages of time spent on the families in the care of an individual health visitor; in short it seems that when a family was known to be going through a period of crisis, additional time was given by the health visitor, though possibly at the expense of other duties.

It is clear that more time could usefully be spent on both categories of problem family than the averages of twenty and twenty-eight minutes a week. Extra time is required to rehabilitate some families where intensive help is needed. But the number of health visitors is unlikely to increase much in the near future. If such selected families could be passed to social case-workers, who might *on average* give up to ninety minutes a week to them, some progress might be made. The health visitors would, of course, continue to visit on health aspects, but would be relieved of the intensive case-work on these selected families. The time thus saved by the health visitors could be devoted to the balance of problem families for which they are responsible.

Summary and Conclusions

The prevalence of potential and hard-core problem families has been surveyed in the nine divisions of the county of London. The total number of such families ascertained was 3022. Of these 2456 had a child or children under 5. 526 had children above that age, and 40 were in welfare establishments.

The following figures refer to families with a child under 5:

1. The percentage prevalence in the divisions for both ranged from 0·52 to 2·25, with a county average of 1·43 (if these extremes are ignored the range was from 1·04 to 1·8).

2. An analysis of ætiological factors in 1000 families revealed emotional instability in 54·5% of the potential and 71·6% of the hard-core problem families; low intelligence or mental deficiency in 42·2 and 67·3% respectively; known or suspected cruelty or neglect in 34·6 and 77·1%; overcrowding or intolerable housing conditions in 44·3 and 60·2%; failure to take advantage of help and services proffered in 30·4 and 51·0%.

3. The average amount of time spent weekly by a health visitor in London was twenty minutes per potential problem family and twenty-eight minutes per hard-core problem family.

4. If social workers could be employed for time-consuming case work on selected families, an additional effort could be made to rehabilitate these families, and the health visitors would be relieved to that extent of their responsibilities, although continuing to visit on health aspects. The time saved by the health visitors could be devoted to the remaining problem families.

To test the advantages of using social workers in this way, they have now been given the main responsibility for the support of a number of selected families.

Many hundreds of my colleagues—doctors, nurses, administrators, and statisticians—have taken part in this investigation. I am indebted to them all, and in particular to Dr. M. MacGregor, Dr. D. Egan, Mr. G. Berridge, Mr. C. W. Shaddick, and Miss E. Robinson.

LONDON'S HEALTH IN 1956

There was no startling change in the health of London between 1955 and 1956.[1] Dr. J. A. Scott, the county medical officer of health, records that in 1956 the infant and maternal mortality rates reached new low records; the death-rate and notification-rate for tuberculosis continued to fall (for the first time on record no male under 25 died from pulmonary tuberculosis); but notifications of dysentery were the most numerous on record. The illegitimate live-birth rate (8·5 per 100 live births) was by far the highest since the war-years' average of 8·4%; and the suicide-rate rose from 0·14 to 0·15 per 1000 (since 1920 it has varied from 0·11 to 0·15).

Public-health work is today extending its scope to encompass attempts to prevent mental illness, respiratory disease (through attacking air-pollution), and home accidents, all of which are common causes of death and disability. The three appendices to the report are thus of special interest.

The first concerns "problem families"—i.e., those who have not responded to the general improvement in social conditions and cannot by themselves improve their position or make use of social services. Children of such families are prone to physical neglect and mental disturbance. The appendix sets out the services dealing with problem families and reports a survey (described by Dr. Scott in an article on p. 204 this week) made to discover the number of potential and hard-core problem families—together these comprised 1·43% of the families in the county, with figures ranging from 0·5% in one division to 2·2% in another.

The second appendix describes investigations that sought to discover links between atmospheric pollution and mortality from respiratory disease. At 7 recording-stations, the smoke and sulphur-dioxide content of the air were measured in the winters and summers of two years; the measurements and some other factors (social class, percentage of residents born in London) were compared with the death-rates from respiratory and other diseases. Dr. Scott sums up the results thus:

"The bare fact of long residence in London appears to be likely to increase the risk of dying particularly from bronchitis; the effect of a smoky atmosphere is also to increase the risk but while a brief sniff of sulphur dioxide is not particularly harmful the dual effects of both high pollution and long residence in London are associated with high mortality. Association is, however, not necessarily a matter of cause and effect. The reason for the poor numerical association of mortality with the indices of atmospheric pollution in [various areas of] London may be that the differences within London are not sufficiently large to demonstrate any difference."

During fog, acute "smog incidents" with many deaths were likely when the pollution of the air reached a threshold of four times the normal winter level.

In his third appendix Dr. Scott points out that the total number of deaths from home accidents rose by about 25% between 1950 and 1955. The small decline in deaths from suffocation and in deaths of young children was more than offset by the increase in deaths from falls, poisoning, and burns, and in deaths in old people. The causes of accidents are broadly inexperience in the young, inattention in the adult, and infirmity in the elderly. Safety devices, such as fireguards, even when properly used are only a partial and temporary substitute for constant supervision of children. The appendix sets out methods of instruction in home safety, including exhibitions; school, newspaper, and cinema publicity; and the training of home nurses and health visitors.

1. London County Council: Report of the County Medical Officer for the year 1956. Pp. 244. 2*s*. 6*d*. Obtainable from the Council, County Hall, S.E.1.

The Wider World

SCHISTOSOMIASIS IN CHINA

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SCHISTOSOMIASIS is regarded as the most serious parasitic disease in China. Its extent is not yet fully known, but in the area of the Yangtse valley and the rich lands to the south recent surveys have revealed over 11 million persons infected, and local infection-rates ranging from 10% to 70%.

The physical consequences of schistosomiasis in the individual sufferer are often savage, as will be seen below; but the effects on the community as a whole are even more disastrous, since it has been estimated that the disease, which is manifest particularly in young adults and in middle age, reduces the working capacity of those affected to well below half normal.

In a predominantly farming community the economic significance of this incapacity is immense. As the population grows increasing pressure is brought to bear on the farmers to produce more food. To do this they must be able to work at their top capacity, which demands good health. It is not surprising, therefore, that China is turning all her available resources to checking clinical schistosomiasis, and controlling its transmission.

A nation-wide scheme of control has been evolved within the last two years and is now in operation and expanding rapidly. The two main points of attack are: (1) the mass treatment of overt infections with the object of bringing clinical relief and reducing the output of infective *Schistosoma japonicum* eggs in the fæces; and (2) the control and eventual elimination of transmission by preventing the pollution of water by human and animal fæces containing ova and by destroying miracidia and cercariæ and the amphibious intermediate snail host oncomelania.

The development and progress of the scheme is the political responsibility of the Ministry of Health in Peking, which works through a small executive lay committee and associated technical groups in Shanghai. In the twelve provinces concerned antischistosomal centres with trained staff have been established for purposes of mass treatment, propaganda, and training of local recruits and for the general administration of regional control. Subsidiary units have been created in the smaller districts right down to the villages and cooperative farms. The actual field work at this level is done by the local farming or village communities, who have among themselves organised trained teams for controlling transmission within their own territories. In this way the local community is acting for itself in its own interests and cooperating at the same time in the wider national scheme.

The Chinese Government quite rightly regards propaganda as an essential technique in the antischistosomal scheme and has organised public information services in the endemic areas on an impressive scale, with the twofold object of achieving control of the disease and of obtaining a more general improvement in social health and cleanliness and, even more important, a genuine desire for an improving standard of living. Working through radio, village communal news-sheets, talks, cinemas, and village committees (often containing a

member of the Communist Party), the propaganda is persistent and all-pervading and is clearly getting results, some of which, such as the astonishing control of flies and litter, are immediately obvious to the visitor.

In effect, " this nation-wide campaign, unparalleled elsewhere in the world, has brought about great improvement in personal hygiene and environmental sanitation and is instrumental in helping to eliminate conditions under which diseases like schistosomiasis are disseminated ". (*Chinese Medical Journal*, 1955.)

The cooperative effort demanded in such a campaign is not limited to the relations between the people and the health authorities only. Active help and advice are needed in addition from allied services, including agriculture, forestry, and water conservancy, for carrying out vital operations such as draining, ditching and reclamation of low-lying land, especially in potential flood areas. The remarkable degree of integrated cooperation already achieved, perhaps more easily in China than in non-totalitarian countries, augurs well for the future success of the whole scheme.

The Chinese have set as their target the practical control of schistosomiasis within twelve years from now. Their cooperative enthusiasm, skill, and dedication to the task should enable them to achieve this objective.

During a recent visit to China with a group of doctors from the United Kingdom I was fortunate enough to see a good deal of the antischistosomal scheme in operation and had opportunities to study the disease itself. I have set down below some of my impressions and some of the information I obtained in the hope that this monumental modern struggle against an ancient disease will interest and excite you as much as it did me.

Clinical

The development of the signs, symptoms, and complications of *S. japonicum* schistosomiasis has often been described; and, on the whole, most of the advanced cases I saw conformed to the expected patterns. There were, nevertheless, numerous interesting points which were emphasised by our Chinese colleagues.

EARLY CASES

It was surprising to find, even in heavily endemic areas, patients with relatively recent infections, in whom a single short period of exposure to cercariæ could be clearly ascertained. Many of these early cases had high irregular fever. Some had diarrhœa but others experienced no gastrointestinal symptoms except anorexia. Tenderness over the right upper half of the abdomen was common and in some cases the liver was tender and easily palpable one or two fingerbreadths below the costal margin. The results of " liver function " tests were usually within normal limits.

The clinical condition became very severe in some cases soon after the onset, with high intermittent or remittent fever, a notably enlarged and tender liver, and the development of a typhoid-like state. A few developed cough and mild pulmonary changes.

Early cases usually responded well to intravenous potassium antimony tartrate therapy. Some, however, developed temporary pulmonary lesions during treatment which could be identified clinically and radiologically and which resembled in many respects those reported in other schistosome infections. The clinical picture is familiar to Chinese physicians but is probably not so well known elsewhere. It may therefore be of interest to summarise an example recently described by Dao Chin and others (1956):

The patient was a 16-year-old boy admitted three months after exposure to infection. He had had irregular fever for ten days. There was some tenderness in the right upper abdomen, but otherwise physical examination, including X-ray of the chest, revealed nothing abnormal; *S. japonicum* ova were found in the stool. The fever subsided slowly under potassium antimony tartrate therapy, but on the thirty-fourth day of treatment (after a total of 0·96 g. of the drug) fever reappeared and the patient developed paroxysms of coughing without sputum. There were some rales over the bases of the lungs and X-ray of the chest revealed extensive bilateral miliary lesions, especially in the lower lung lobes. The patient did not feel ill and spontaneous recovery took place after a few days. Six weeks later the lesions were still present but clearing.

The characteristic features of this syndrome, which also appears in chronic cases, were the fever and cough developing towards the end of antimony therapy, the miliary infiltration and patchy consolidations in the lungs, the continued well-being of the patient and the self-limited course. These peculiar pulmonary changes are believed to arise from fresh dissemination of ova to the lungs or from allergic activation of existing circumoval lesions.

The severe pulmonary complications which occur in late *S. mansoni* infections and lead to cor pulmonale seem to be rare in *S. japonicum* infections even in cases with extensive hepatic and splenic involvement.

COMPLICATIONS

Gastrointestinal complications are common in late japonica schistosomiasis,. The lesions, which include polyposis, hypertrophy, and fibrosis of the colon and rectum, are similar to those seen in *S. mansoni* infections. The same is true of the liver and spleen involvement. The cases I saw in the Endemic Diseases Hospital in Shanghai, for instance, closely resembled those distressing examples of late *S. mansoni* infection so common in lower Egypt.

The abdomen was distended with fluid and the superficial collateral venous vessels were very prominent (fig. 1). The liver was usually large and firm but occasionally not enlarged. The spleen was invariably enlarged, sometimes enormously so. There was extensive œdema of the legs and the back.

In cases associated with fibrotic changes in the liver, portal hypertension had developed with extensive abdominal collateral circulation. Varicose œsophageal veins could often be demonstrated radiologically, but hæmorrhage from these vessels was apparently relatively infrequent. Severe and catastrophic bleeding did sometimes occur, however, usually from rupture of varices of the basal gastric veins.

These advanced signs were found in young to early middle-aged adults with long histories of exposure to infection, stretching in some cases over many years. Most of the patients were

Fig. 1—*S. japonicum* infection with hepatic cirrhosis, portal hypertension, and ascites. Note the prominent superficial veins.

men, probably because of their greater risks of exposure. There was no satisfactory information about the relation between the development of the complications and the intensity of the infection.

Similar liver damage and fibrosis with ascites and portal hypertension and enormous enlargement of the spleen occur in older children, sometimes associated with pronounced dwarfism and retardation of sexual development. Dwarfs of this sort were in evidence in several of the rural treatment centres I visited in the highly endemic areas. Some had shown considerable improvement with antimonial treatment.

The pathogenesis of liver lesions is still not fully understood, but the indications are that egg deposition plays a more significant part than the presence of the adult worms. Thus, bisexual infections in mice and rabbits have been shown to produce much more severe pathological liver changes than unisexual infections, and intrahepatic injection of eggs more serious effects than injection of adult worm extracts, including infiltration of the connective tissue of the portal tracts and periphlebitis of the portal venules. Changes in the vascular pattern of the portal tracts such as described by Bogliolo (1957) in human *S. mansoni* infections have not been recorded.

THERAPY

No entirely satisfactory chemotherapeutic agent with suitably low toxicity and high efficiency has yet been discovered.

There is general agreement that the best results are obtained by the parenteral administration of trivalent antimonial compounds, of which potassium and sodium antimony tartrate are considered the most effective and are most commonly used. These drugs are toxic and serious side-effects may develop even with carefully graded dosage. The therapeutic activity and toxicity of a given course of treatment have been found to run parallel to the amount of antimony administered. Contrary to widely held European views, no difference in toxicity has been observed between the potassium and the sodium salt, the former of which is in general use.

Certain other antimonials, such as antimony gluconates, citrates, and guanides, are also active against the infection but for reasons of expense or toxicity are not favoured clinically.

The results of oral therapy have not been encouraging. Potassium antimony tartrate is the only antimonial which has been found to have some effect by this route (about 60% of its parenteral activity). Lucanthone (' Miracil D ') and certain acridine derivatives have been found ineffective clinically and experimentally.

Studies in animal infections have indicated that the duration of the infection has little influence on the therapeutic effect of potassium antimony tartrate. The interruption for a short time of a course of therapy and its subsequent completion has no obvious effect unless the interval is long. On the other hand, full dosage given a long time after an inadequate course is not always effective, suggesting the development of some drug resistance.

The necessity for better and safer drugs has led to extensive research in which many natural and synthetic compounds have been examined either clinically or in laboratory infections in mice, rabbits, or dogs. In animal infections the most active antimonial has been found to be ammonium antimony gluconate; but this compound, which has about the same toxicity as potassium antimony tartrate, has not yet come into extensive use. Compounds containing mercury, tin, and acridine dyes have proved largely ineffective. So have derivatives of the diaminodiphenoxy-heptanes and hexachlorethane, a drug successfully used by the Russians for the treatment of opisthorchiasis.

TREATMENT OF JAPONICUM INFECTIONS

Length of course (days)	Total dosage mg. per kg. body-weight)	Method *	Relapse-rate † (%)
1	8	3 doses; one every 3 hours	60
3	12	1 dose every 12 hours	32
7	15	1 dose daily	15
20	25	1 „ „	15
25	30	1 „ „	16

* In the 1-day, 3-day, and 7-day courses the drug was made up as a 1% solution in 25–30% glucose. In the longer courses the glucose was sometimes omitted. Each dose was given very slowly. Maximum single dose: 20 ml. of 1% solution.
† Techniques described under the section " Results ".

Chinese native herbs have been tested in laboratory animal infections and in in-vitro experiments against artificially cultured adult schistosomes. Of some 200 examined, several, including the chrysanthemum, have shown some activity. Clinical trials of these drugs are being organised mostly in the treatment of severely complicated cases.

Details of Therapy

Courses of antimonial drugs used in the past have had the great drawback of keeping the patient too long from his work. Attempts have been made, therefore, to reduce the length of treatment to an effective minimum. Clinically and experimentally, intensive therapy, such as that devised by Alves and Blair, has been found very toxic and less effective than longer courses. It has been discovered recently, however, that satisfactory results can be achieved by reducing the standard twenty to twenty-five days' course of therapy to a week. This technique has resulted in a great saving of time and has proportionately reduced the immobilisation of the working patient to a period he is prepared to accept, thus leading to more efficient therapy and fewer relapses.

Some of the dosage regimes which have been examined are detailed in the accompanying table. The figures are based on the results of a single experiment carried out in hospitals and clinics and involving over 5000 cases of active *S. japonicum* infections. The therapeutic agents were potassium or sodium antimony tartrate given intravenously.

In the field the therapeutic courses most generally used now are the seven-day and twenty-day regimes. Presumably the former will become the standard technique.

Results

In the above investigation, stools were examined for *S. japonicum* eggs before, during, and after treatment, by hatching and sedimentation methods. In some cases rectal biopsy was also performed. With successful treatment eggs in the fæces became fewer about a forthight after commencement of therapy and disappeared during the fourth week. Early indications of success were the passing of opaque eggs which would not hatch, or the hatching of miracidia which did not survive beyond a few minutes. In the follow-up, groups of three successive stools were examined every three months for a year after treatment.

As will be seen from the table, the very short intensive courses were not as effective as the longer lower-dosage regimes. Of the cases which relapsed, 70% again passed eggs within three months of treatment and 85% within six months. Examination beyond six months revealed only a further 3%. The routine follow-up recommended was therefore the examination of three successive stools at three and at six months after treatment, or, as a minimum requirement, at six months. " Cure " was defined for practical purposes as being egg-free after twelve months. It is realised, of course, that this may not be an adequate definition in some cases but it is believed to cover most.

Side-effects of Potassium or Sodium Antimony Tartrate

Immediate toxic effects are often severe and occasional deaths occur.

In the one-day and three-day intensive courses side-effects were notable. Severe anorexia developed early and nausea and vomiting were common. A short period of dry coughing frequently appeared during the injection of the drug or immediately afterwards.

In the seven-day course, there was often pronounced anorexia and nausea and vomiting which appeared about the third day and persisted until the finish of the treatment. Coughing was usual.

In the longer courses, in which the dosage was built up more slowly, similar toxic effects developed and reached their maximum about the eighth day. Side-effects were less common and less severe in patients under 16 years of age.

Similar immediate toxic effects were prominent with all the other active antimonial compounds tried. Exfoliative dermatitis occurred in a few cases in the later stages of treatment.

Treatment of Complications

Patients in advanced schistosomiasis are treated in general hospitals or regional centres. On admission they receive as a routine a high-protein diet and appropriate vitamins for a week or more while diagnostic procedures are carried out. Cases with obvious hepatic involvement are placed on a low-salt diet.

Certain severe cases, especially in the hepatic group, are selected (at their own request) for treatment with Chinese herbs, some of which cause watery catharsis with considerable relief of œdema and even of ascites. I was told that cases which responded in this way were afterwards given standard antimonial treatment, sometimes successfully. So far as I could ascertain the clinical use of Chinese remedies for schistosomiasis was at present confined to these complicated cases.

Portal hypertension, which develops in chronic or frequently reinfected cases in early adult or middle age, is regarded as the most severe complication.

Although in such patients ascites is common and often severe, paracentesis is rarely practised except for bringing essential immediate relief, since it has been found that the frequent removal of ascitic fluid often establishes a " chronic " state in which regular drainage becomes necessary. Attempts are made, however, to reduce the fluid by salt-free diets and diuretics.

Hepatic coma and mental symptoms are common. Reduction of protein intake sometimes leads to rapid and dramatic improvement in such cases.

Hæmatemesis and melæna are serious hazards, the former arising from rupture of varicosities in the gastric rather than œsophageal veins.

Hepatic disturbances and hypersplenism have been relieved by various surgical techniques. Thus, splenectomy has been found beneficial in many cases, and is usually followed by full courses of antimonials.

Cross-circulation techniques including splenorenal or portacaval anatomosis and ligature of the hepatic artery have been carried out for the relief of portal hypertension. Some cases have benefited greatly by these procedures and have lived for years after operation. The operative mortality is however still high.

The prognosis of complicated hepatic cases on the whole is poor, whatever is done for the immediate relief of symptoms. Nevertheless, many of the intermediate cases, even those in which severe hæmorrhage has occurred, are temporarily benefited by treatment.

DIAGNOSIS

In early cases the diagnosis depends on the discovery of the ova of *S. japonicum* in the fæces or in scrapings or biopsy specimens taken during proctoscopy.

Eggs in fæces.—The ova are revealed by examination of stool smears, by stool sedimentation methods or by the hatching technique in which a sample of fæces is allowed to come into contact with water so that miracidia hatch out. Comparative studies of these methods carried out on a very large scale have shown that the direct examination of the stool is the least, and the hatching technique the most, reliable. Thus, in one study involving over 5000 patients, a single examination of the stool by the hatching technique disclosed 1500 more positives than the sedimentation technique.

Examination of successive stools also increases the overall chance of finding eggs. For instance, in a group of 980 cases in which ten consecutive stools were examined, 480 were found positive at the first examination and 750 by the seventh. Thereafter further examinations revealed very few more positives.

Rectal biopsy.—All clinicians seem agreed that the examination of rectal biopsy material considerably increases the chance of positive diagnosis even when there are no obvious lesions. To facilitate immediate control of accidental hæmorrhage following biopsy, specimens are taken from tissue not more than 6 in. in from the anus.

Antigens similar to those used for intradermal tests are used to determine the presence of complement-fixing bodies in the sera of early cases, late cases, and cases at various periods after successful treatment.

With suitable antigens (including the " liver-ova " antigen referred to below) positive reactions are obtained in the majority of active infections (85–90%), and in a smaller proportion of treated cases. False positives are rare, even in cases in which other trematode infections were present. The test has some prognostic significance. For instance, in a series of examinations using adult worm protein-fraction as antigen, positive reactions were obtained in 15 out of 15 cases tested three months after treatment, in 7 out of 9 six months afterwards, in 5 out of 11 up to two years afterwards, and in 2 out of 7 cases examined two to four years afterwards.

Other successful serological tests which are being studied, especially in experimental animal schistosomiasis, include precipitin reactions and cercarial (C.H.R.) and miracidial fixation. The latter are said to be in some respects more sensitive than complement deviation but are not in general diagnostic use.

Diagnosis in Mass Surveys

Direct stool smear examination, sedimentation, concentration and hatching, rectal biopsy, and serological methods are all unsuitable for large-scale surveys. In the last few years therefore much attention has been directed to the study of intradermal antibody-antigen reactions in all stages of the infection before and after treatment. Most extensive research has been carried out by Chung (1956) and others, for instance, on the activity of antigens made from adult worms of either sex, from extracts of polysaccharide and protein fractions of adults, from eggs, miracidia, cercariæ, and from snails. These workers recently prepared from the livers of laboratory-infected rabbits a powerful antigen which has been mass-produced and used in screening the population of something like 60 million believed to be at risk to schistosomiasis.

The Chung antigen is prepared as follows :

Rabbits are infected with cercariæ, and are killed six to ten weeks later. The livers, which are filled with pseudotubercles containing ova, are homogenised after removal of adult worms, and dried. A 1% saline extract of this material is made up with 1 in 10,000 parts of ethyl mercuric thiosalicylate as a preservative, and can be stored in the cold for several months without loss of activity.

The skin test is carried out by the intradermal injection of 0·1 ml. of antigen diluted to 1 in 1000 or 1 in 2000. The control is an intradermal injection of 0·1 ml. of saline containing the same quantity of preservative. Readings are made about fifteen minutes after the injection. A positive reaction is shown by the appearance of a weal with pseudopodia, sur-

rounded by a zone of erythema. The reactions subside after an hour.

The diagnostic value of this skin reaction in individual cases is limited by cross-reactions which may arise in infections with other trematodes, notably paragonimus, clonorchis, and fasciola (from the adults of which active antigens may also be made). To some extent this difficulty may be overcome by determining the reactions of the skin to increasing dilutions of the several specific antigens until the point is reached at which the reaction to the schistosome antigen remains positive and that to the others has become negative. In mass surveys in areas where the distribution of the other flukes is approximately known, however, a positive specific intradermal reaction to the schistosomal antigen is reasonably considered significant.

The results of intradermal reactions to the liver-ova antigen correspond to those of complement-fixation reactions with the same antigen, in that positives occur in a very high proportion of active infections and are progressively fewer after treatment. Similar results so far as intradermal reactions to specific antigen are concerned have been reported in *Schistosoma hæmatobium* infections by Sherif (1956) and others, but Oliver-Gonsalez (1954) observed the reverse with a *S. mansoni* egg antigen. Chung suggests that the Chinese antigen owes some of its activity to the liver tissue from which it is prepared.

Methods and Technique of Schistosomiasis Control

FÆCES AND SCHISTOSOMAL EGGS

In the campaign against schistosomiasis emphasis is being laid particularly upon limiting the dissemination of infective eggs by controlling promiscuous defæcation and by storage of fæces for up to a week before use in the fields, in order to allow the ammonia generated to destroy the ova, which might otherwise survive for several months. The cooperation of the people has been sought by propaganda expounding the social and sanitary advantages of fæcal control and by official payment for night-soil, pro rata, according to age (? on a basis of weight for weight).

In most villages and cooperatives today, each family has its own collecting-pots which are emptied daily into common earthenware tanks in the village compound. The communal pots are sealed when full and the contents are removed after the requisite time and transferred to open tanks in the fields for immediate use. The collection of fæces in this way, together with subsequent properly supervised washing of individual family and community vessels, avoids one of the principal dangers of the past, when washing of night-soil containers in the ditches and canals was a common means of spreading the infection to the local snails.

The dissemination of infection by human fæces is being brought under control in this way, but a major problem still needing a solution is the conservation of animal fæces.

This is particularly so in domestic animals which have been shown to be a dangerous source of infective eggs, especially cows and the ubiquitous water-buffaloes, which wallow in every irrigation ditch (the main unsavoury homes of the intermediate host). Moreover, some animals, including the coprophagous pigs, easily become infected and pass eggs in the fæces, or are capable, like dogs, of passing viable ova after eating infected material. Since the water-buffalo is the most important of all domestic animals, its susceptibility to infection is of primary significance and has to be taken into account in the control of schistosomiasis. Medical and veterinary workers are collaborating to find practical means of reducing such animal infection and controlling the dissemination of suspect fæces.

CONTROL OF SNAILS AND CERCARIÆ

The prevailing methods used for killing snails are based on the results of years of concentrated research which have been going on in the field and laboratories, such as those of the Shanghai Institute of Parasitology, where the bionomics of oncomelania from all parts of the country have been studied, and their reactions to various physical and chemical environments examined.

Infection of Snails

The breeding habits of oncomelania have been carefully watched with a view to finding biological techniques for limiting the snail population in the field. It has been found that mating takes place through the year but is at a minimum in the spring and early summer and at a maximum in the early winter. Hibernation starts in the autumn. Egglaying and hatching also go on throughout the year, but the latter is slowed by cold. In the laboratory the adult snail develops in about six months.

Snails are most numerous in wet, moist soil near water and thick grass. The population is densest in irrigation ditches and becomes progressively thinner along the banks of rivers and canals, in rice-beds, and in the paddy fields. Isolated pools of water are less important breeding-grounds. The mortality-rate of uninfected snails in the field does not change much with the seasons but that of infected snails increases in the summer and decreases in the early winter. The mortality of both is higher in dry conditions.

The activity of snails has been studied under many circumstances. They are most active at night and crawl at a rate of about 3 metres in a month. They are found on land mostly within $1^1/_2$ metres of the water surface, fluctuations in the level of which appear to make little difference.

Naturally infected snails are found throughout the year; the highest infection-rate is in August-September. Using cercariæ from rabbit-liver ova, laboratory infection can be achieved in about 60% of many local strains of oncomelania at temperatures of 21 to 36°C, but there is some variability in the susceptibility of snails collected from different districts in the endemic area. Cold conditions very considerably reduce the infection-rate. Planorbiid and other genera so far examined have not been infected.

Anticercarial Measures

Cercarial discharge from snails occurs earlier after infection in a hot environment than in the cold. Snails may remain infected and capable of discharging cercariæ for over two and a half years.

Cercariæ from captive or naturally infected snails remain infective for up to three days when suspended in water, provided the temperature is low. There is no difference in infectivity towards mice amongst cercariæ collected at various times of the year under natural or laboratory conditions.

Although human infection most commonly takes place as the result of penetration of cercariæ through skin exposed to the water of canals and irrigation ditches (fig. 2), it can also occur through contact with minute droplets. Dew-drops in some paddy fields have been found to be charged with active infective cercariæ in very large numbers. It is not yet known how significant this path of infection is, but it clearly

Fig. 2—Exposure to cercariæ in canal water.

has to be considered in attempts to limit the spread of infection, particularly in local areas in which human or animal defæcation has not yet been adequately controlled.

The destruction of cercariæ and the prevention of their penetration through the skin have been studied by means of various chemical techniques and the use of protective clothing. Under standard experimental conditions in which the shaven bellies of white mice are exposed to water containing known numbers of cercariæ, over a hundred test substances, including native herbs, have been examined by applications to the animal skin of oils, ointments, infusions and solutions. Mixtures containing Tung oil have been found effective in protecting mice and have been used in the field in the form of repeated applications to exposed areas of skin. Many substances which kill snails have also some antimiracidial and anticercarial effect. Such methods may have some temporary value but are regarded only as palliative.

Chemical Control of Snails

The toxic action of many substances in the form of solutions, emulsions and powders has been studied, including copper sulphate, paris green, calcium arsenate and arsenite, calcium cyanamide and superphosphate, wintergreen oil, and phenol.

Copper sulphate is a good molluscicide in a dilution of 50 parts per million, at which concentration most of the others are ineffective. The copper salt is expensive, however, and

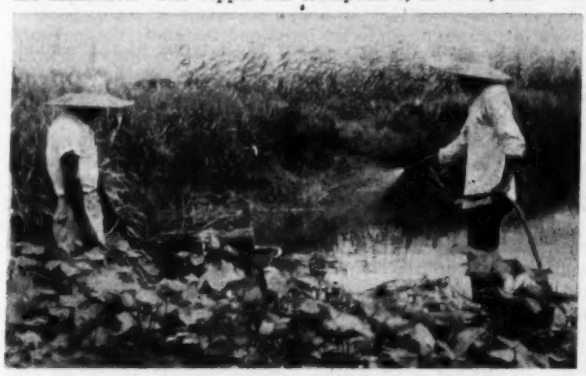

Fig. 3—Ditch spraying with calcium arsenate.

relatively inactive when mixed with mud or dirty river-water. The compounds most commonly used on a big scale are paris green and calcium arsenate (or arsenite). The former is effective but slow as a spray in concentrations of 9·0 g. per square metre but is unfortunately harmful to animals and rice crops. The latter is freely used as a spray in concentrations of 6 to 12 g. per square metre in areas away from livestock or humans.

Synthetics such as dicophane (D.D.T.), gammabenzene hydrochloride dimethylphthallate and sodium pentachlorophenate, and substitute phenols, such as sodium tetrachlorophenate and diethylparanitrophenyl thiophosphate (E.605) have also been examined. Of these the latter group are most active molluscicides, but some of them are unfortunately extremely toxic to fish and are ineffective in the cold; their activity is notably reduced by contact with mud or dirty water.

Nearly six hundred Chinese herbs have been tested, of which fewer than twenty have any appreciable molluscicidal effect in concentrations of 1% or lower. For example, infusions and oil emulsions of croton have been proved successful under laboratory conditions but considerably less so in the field. So far no indigenous drug has been found economically satisfactory for use on a large scale.

Fig. 4—Using a petrol flame-thrower on the banks of ditches.

Physical Methods of Killing Snails

During the summer large numbers of snails are found on land within $1^1/_2$–2 metres from the water line. Spraying, burning, and scalding of this area are all effective killing measures and are widely used in villages and other occupied regions. The cheaper technique of spraying with poisonous chemicals, such as calcium arsenate, is restricted to the ditches and canals in the fields (fig. 3).

The burning of the grass on the banks of small creeks and ditches is carried out by means of portable petrol flame-throwers carried on the shoulders or on wheelbarrows. The banks of larger canals and streams are scorched by flame-throwers mounted on punts, and burning carbon monoxide gas made on the spot (figs. 4 and 5). This process is slow but effective, as I could see for myself when I joined the hordes of village children picking up roasted snails in the wake of the operators.

Snails embedded in mud are not destroyed by burning or spraying and have to be killed by other means, the best of which is some form of ditching.

Snails are normally concentrated within 10 cm. of the surface of the mud near the water level; if they become buried deeper they suffocate. Farmers are therefore encouraged in the winter months to concentrate on the time-honoured better-

Fig. 5—Scorching the banks of a canal.

ment of their canals and ditches by manually removing and burying the snail-containing mud. In this way the banks of waterways are cleared yearly of weeds and the ditch beds are deepened or replaced. A recent field experiment showed that the more thorough process of filling in the old ditches and digging new ones was the most effective and accounted for almost all the snails buried in the mud. The simpler process of clearing overhanging grass and covering one side of the ditch with soil from the other is less effective, but removal of the superficial layers of earth from both sides and storage or burial of this material is a highly efficient technique, 70% of the snails dying within a month and 98% in three months.

Simple methods of this kind are now being used on a large scale, especially during the winter, after the killing of active snails in the summer by means of burning or spraying. The effectiveness of these procedures was demonstrated recently in one experimental area in which the population of snails was reduced by 98% twelve months after treatment (filling in and replacement) of 15 km. of ditches.

Other physical methods of control which have proved valuable in appropriate areas are reclamation of " low or flood land by the erection of embankments and the subsequent removal of the overgrowing grass ", and in some cases the conversion of reclaimed rice fields for the growth of other crops. These more extensive operations have been completed by the antischistosomal organisation in collaboration with other departments and Ministries. They illustrate the combined operations necessary for the successful outcome of the nation's all-out totalitarian attempt to " liquidate " the threat of schistosomiasis to the future of the new China.

The combination of burning and spraying plus ditching is already having a considerable effect on the population numbers of the intermediate host. This, together with the mass-treatment campaign which is already in active operation, cannot fail greatly to reduce the endemicity of schistosomiasis within the afflicted areas. When suitable methods for the prevention of infection in the domestic-animal reservoirs have been evolved, the disease should be brought swiftly under control.

My thanks are due to my many Chinese friends for valuable help and advice.

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Medicine and the Law

Jury's Responsibility in Assessing Diminished Responsibility

AT the trial of a young man on a charge of capital murder by shooting, one of the defences put forward was that he was suffering from diminished responsibility within the meaning of section 2(1) of the Homicide Act, 1957. Although there was evidence which could have justified the jury in finding that it was a case of diminished responsibility, it was not such as to compel them to come to that finding. According to the evidence the man had an intelligence quotient of 110. Copies of section 2(1) were handed to the jury so that they could see it, and the judge, summing up, read the section to them, told them that it was for them to decide whether or not the man was suffering from such an abnormality of mind as substantially to impair his mental responsibility, and then reviewed the evidence on that issue. The jury convicted the man, who was sentenced to death. On his appeal it was argued for him that the judge should have given the jury a direction as to the meaning of the expressions " abnormality of mind " and " mental responsibility " in the section, and that, since counsel for the prosecution in his speech to the jury had submitted that " abnormality of mind " was limited to a deficiency of intelligence and that certain conditions of which evidence had been given —emotional instability, temperamental instability, psychopathic personality, gross personality disorder, immature personality, and abnormality of control of the emotions—could not come within the expression, the judge should have ruled upon those submissions. For the convicted man it was contended that " abnormality of mind " was not equated with deficiency of intelligence but that a person suffering from those conditions and unable to control his emotions came within the section.

The LORD CHIEF JUSTICE, giving the judgment of the court, said that a judge could do no more than call the attention of the jury to the exact terms of the section which Parliament had enacted and leave them to say whether upon the evidence they found that the case came within the section or not.

When Parliament had defined a particular state of things, as they had defined what was to amount to diminished responsibility, it was not for judges to attempt to define or redefine the definition. It was a question of fact in any particular case for the jury to decide. The conception of diminished responsibility was borrowed from the Scottish common law which recognised that a man might be not quite insane but a borderline case and that that was the sort of thing which amounted to diminished responsibility. Where a defence of insanity was set up it had always been for the jury to find whether or not there was a disease of the mind and that could only be found by listening to the medical evidence and the facts of the case and coming to the conclusion whether what the defendant did was the act of a sane or an insane man. So here all that could be done was to read the section to the jury and say " these are the tests which Parliament has said are to be applied. You are to consider whether the defendant has abnormality of mind " —and his Lordship did not know how that was to be defined because it was very difficult to say what was a normal person —" whether arising from a condition of arrested or retarded development of mind or any inherent cause or induced by disease or injury. If you find any of those matters in the evidence, you may find a verdict of manslaughter and not of murder ".

In English law the expression " What would be the act of a reasonable man? " was very common, but his Lordship did not know of any definition of a reasonable man. The jury had to decide for themselves whether the action in question was the action of what they would call a reasonable man and so here the matter was entirely one for the jury. The judge had put the case in the only way it could be put and it was not his duty to enter into metaphysical and philosophical distinctions between intellect and emotion. The appeal was dismissed.

REGINA *v.* SPRIGGS. *Court of Criminal Appeal:* Lord Goddard, *C.J.*, Hilbery and Salmon, *J.J.* Jan. 14, 1957. Graham Swanwick, Q.C., and C. H. Durman (registrar, Court of Criminal Appeal); R. K. Brown (Director of Public Prosecutions).

J. F. LAMB
Barrister-at-law.

In England Now

A Running Commentary by Peripatetic Correspondents

ALTHOUGH we always say what we mean, we do not invariably mean all that we say; but on this occasion it is with no negative reservations that we welcome the appearance of a new journal, the *Journal of Negative Results* (*J. neg. Res.*), and hail it with the freshly minted phrase that it "fulfils a long-felt need". Indeed, so much material is awaiting publication in this field that the editorial board have adopted a strict policy; for the time being, papers are only accepted if statistical analysis of the results gives $P > 0{\cdot}9$. Later, the editors hope to be able to include papers whose results are statistically significant, but are otherwise meaningless.

For the opening number the editors have secured a distinguished panel of contributors, but diffidence in face of the laws of libel forbids us to mention their names. The papers include an interesting historical article on Medicine in Laputa, and there is an essay on the negation of negation. The journal has the distinguished format which we have come to expect from the Erewhon University Press, but we hope that in future issues the blank cover will be replaced by something more misleading. The motto of the new journal is taken from Faust—"Ich bin der Geist, der stets verneint." We wish the editors well in their new venture, and hope to assist them with papers from time to time.

* * *

We had known for some time that the Royal Ontario Museum in Toronto was putting on one of the largest exhibitions of English silver ever assembled and that it was being opened by the Governor General. This made the opening a social as well as a cultural highlight, and 1500 of the Best People were invited. But, of course, in a population of only 16 million it is not really selective to be one of the 1500, and so 300 of the Very Best People had been asked to dinner before the opening. But 300 is such a crowd, so 40 of the Really Very Best People were going to a cocktail party before the dinner before the opening. The big problem was how to face my friends on Monday because I had not been invited even to the opening, and some of them might be one, two, or even three up. In a flash of genius I got myself admitted on the previous Friday, to the press showing (on the grounds of being a *Lancet* Peripat).

The press show was rather like going to see a film star in his dressing-room, because the display had not yet been completed. There were great hunks of silver lying about all over the place, and knee-deep in candlesticks, mirrors, sauce-boats, and salvers there were policemen with guns. They looked a little sheepish; it did seem pedantic to guard the stuff when the museum staff were continually casually mislaying objects worth a hundred thousand dollars. Also around the place, among my temporary press colleagues, were the art critics who had been reading that *Penguin* book about silver. This gave them the chance to say "surely that's a trifid spoon?" The label confirmed this, but it plunged me into humiliation. I did not know that one ate trifids with a spoon. Ah, here is a trifid fork. So next time I am offered trifids at a banquet I shall nonchalantly pick up a spoon and fork, and not use a knife—if I can find out in the meantime how to recognise trifids.

I found that many of the still open display cases contained notes pencilled on paper to show where the pieces were to go. Here is one that says "the good one". That is the height of patronage, it seems to me. Here is a solid silver picnic set, of all things, made in 1680, with knife, fork, spoon, condiment box, and nutmeg-grater. There are 13th-century spoons with no nonsense about them and rococo work with a lot of nonsense; graceful sauce-boats and curly salt-cellars; the Everest cup and the Coronation cup. There is a silver bathtub and an aspidistra pot, both labelled as wine-cisterns.

By now I was getting pretty blasé about silver and was baffled rather than impressed by a mirror belonging to the Duke of Brunswick. This is about as big as a bus, with 3-D coats of arms all over and a couple of silver chairs to match. Another pencilled instruction catches my eye. "Put the *art nouveau* thing here." That makes my day. "The *art nouveau* thing"—so casual, with a hint of knowing what *art nouveau* is. I'm all set for Monday now. "Oh, are you going to the opening tonight? I saw the show last week—you really must look out for a rather nice *art nouveau* thing they have there . . ."

* * *

My two-year-old was lying in his bath and probably for the first time his eye fell on his umbilicus. There was a horrified expression in his eye and he called out, "Mummy, Mummy! Look! Hole! Mend!"

* * *

The lumbago-sciatic shooting now being open [1] we can look forward to some smart exchanges, for the subject has long been controversial. Even in Shakespeare's time the widest extremes of view were evidently held. The remark of the 1st Gent. to Bawd "How now! Which of your hips has the most profound sciatica?" (*Measure for Measure*) shows the ribald back-slapping approach as opposed to Sycorax's serious and intensive treatment of Ariel by twelve years manipulation in a cloven pine without anæsthetic (*Tempest*). Rigorous though this regime may have been, it undoubtedly restored the patient the full use of his exceptional mobility.

* * *

THEBES

It was evening when we reached the village,
After the long drive over hot, dusty plains.
There, still sharing some needs with ancient wayfarers,
We stopped for bread and water,
So learned by accident, believing it many miles distant,
That this was Thebes.

Could this be Thebes, a city of kings?
We might have known, out on the plain
Where corn ripened and the kites and vultures scavenged
And pitiless heat beat down,
That there was the inevitable setting
For Antigone. Almost we passed her,
Still pitifully scraping a grave for her dead brother.
Out there nothing has changed.
But here in the streets, who remembers doomed Œdipus?
Who has even heard of successful Creon?
Yet this was, this is Thebes.
Here now, here ever,
Left by the long since ebbing tide of history and myth and drama,
The grey-haired elders, the perennial chorus,
Sit sipping their drinks, savouring the flavour of life and commenting on it
At small tin tables on the shady side of the street.

There are locked, rusty gates nearby (the elders will direct a pilgrim)
Where carved, broken stones,
Mortal relics of an immortal past,
Lie in a sleepy garden.
Petunias and hollyhocks and flowering trees
Wave them a careless tribute of royal colours.
Heroes and lovers, human or sired by gods or dreamed by poets,
Sleep alike their long sleep
While hawks and doves nest neighbouring among crumbling masonry.
To this garden we came, rare visitors.
The custodian, shrunken, wrinkled, brown,
Unordained priest of a self-consecrated shrine,
Welcomed us, stroked a stone lion for us,
Intoned the names of the muses, spelt out caressingly
A little tombstone of much loved Demetrius.
He gave us each on parting a rose and a sprig of mint,
But these we lost, and now have nothing left of Thebes
Except the ghost of a perfume and a memory. .

1. *Lancet*, Jan. 4, 1958, p. 20; Jan. 11, 1958, p. 107.

Letters to the Editor

THE "LADDER"

SIR,—In giving evidence before the Royal Commission last week I wanted to put in a word for senior registrars who by their energy and intelligence had climbed the ladder at their medical schools, only to find too often that it led nowhere.

Let me explain what I mean by this ladder. The ambitious boy who enters a medical school singles himself out by winning prizes in the annual class examinations, and later by obtaining honours or perhaps a gold medal in university examinations. After qualifying he must compete for a series of posts, and all the time the competition grows fiercer. Indeed he may be eliminated before he is ready to take the last hurdle, that of senior registrar, because he has failed in the examinations for the higher degrees. In this manner, from the survivors of this cut-throat struggle, the hospital staff is elected. And the young consultant so chosen is now singularly efficient, not only on account of the severity of the competition but also because he has gone through a period of intensive training, which often extends, according to the Royal College of Physicians, over a period of ten, fifteen, or even twenty years after qualifying. In this way he has accumulated a store of knowledge and experience which gives him a great pull over those who have not had the advantage of this discipline.

But will this last? Material rewards are of course not the only incentive, but in the past the incomes enjoyed by men who were successful in consulting practice led students at the top of their year to attempt to climb this ladder. But these inducements have been whittled away and if these men can no longer look forward to an adequate reward for their labours, they may plan their lives differently. They know that now they will have to face long years of training after they have qualified, years of comparative penury, years of uncertainty, because in the end success is far from assured. And they know too that in the event of failure no alternative career in general practice may then be open to them at their age. The waiting years have been unduly drawn out, and the disparity between the number of consultant vacancies and the number of senior registrars competing for them is such that men are beginning to ask "Is the game worth the candle?" Already there has been a sharp fall, both in London and in the Provinces, in the number of applicants for the post of registrar. The writing is on the wall for those who can read.

I had hoped that if I could describe accurately the means used by hospitals to sift candidates for election to their staffs I might be able to convince the members of the Royal Commission that the senior registrar who had emerged successfully from this ordeal ought not to be thrown lightly on the scrap-heap, that his achievement was worthy of some reward. Moreover while I was speaking of the senior registrar I had at the back of my mind the whole question of consultant recruiting. Alas I was met only by doubt whether there was in fact any such ladder, that all men in our calling are equal. If I had been wise I should have left it there. Others in good time would have taken up the task of explaining how the consultant ranks are recruited. But in the quick exchanges that followed I allowed myself to be drawn outside my argument. I was asked in effect whether I considered the consultant a person apart, and only then did I tumble to the fact that my arguments for rewarding the man when he had climbed the ladder had been taken as critical and even derogatory of those who had never even made the attempt. I protested. I spoke of the "very high standard" of general practice as I had known it and of the "extreme ability" of many practitioners in my own experience. But the damage was done.

I was dean of a medical school throughout the twenty-five years I was on the hospital staff, with the exception of a few months in 1920, and it was my custom to spend about three-quarters of my day among my students. I was completely engrossed in them as individuals, in their plans for the future, in their hopes and fears. And I like to think that there existed between us mutual respect and even affection; certainly on my part there has been an enduring regard for their solid worth and good sense. The overwhelming majority became general practitioners and I should be sorry if any of them were led to believe by the enterprise of the Press that I have changed and admire no longer the fine job they have made of their lives of service.

London, W.1. MORAN.

DEATH FROM POSTMATURITY OR INDUCTION OF LABOUR?

SIR,—Mr. Gibberd (Jan. 11) rightly points out that present methods of inducing labour are not entirely free from danger. However, experience does not support his suggestion that the dangers of induction outweigh those of postmaturity in uncomplicated cases. In a group where the dangers of postmaturity are relatively great (primigravidæ aged 25 or over) we adopted in 1953 a policy of routine induction in the 42nd week and began to use cæsarean section more freely, particularly if there are signs of fœtal distress, especially meconium in the liquor amnii. This policy has been very successful in producing a marked reduction of perinatal mortality. Dr. Elizabeth Turnbull and I have published the relevant data elsewhere.[1]

Midwifery Department,
University of Aberdeen. DUGALD BAIRD.

SIR,—I would like to present figures from the Obstetric Unit, University College Hospital, for comparison with those of Mr. Gibberd.

From 1952 to 1957 inclusive 386 patients (240 primigravidæ) were induced for postmaturity, mostly close to the 42nd week of gestation. There were 20 cæsarean sections. There were no deaths in this series attributable to the induction or to anoxia or asphyxia. 3 deaths which occurred were:

1952. Stillbirth, weight 7 lb. 3 oz., 42 weeks. Low amniotomy revealed meconium. Fœtal distress developed 11 hours later and the fœtus was delivered by cæsarean section but failed to breathe. Necropsy showed: nutmeg liver, cystic adrenals, and a phæochromocytoma. The mother, a primigravida, had rubella in early pregnancy and positive Wassermann and Kahn reactions.

1956. Neonatal death. Mother primigravida $2^1/_2$ weeks postmature. Induction-delivery interval 98 hours, labour 20 hours. Difficult forceps delivery, baby died 3 hours later. Bilateral tentorial tear attributed to difficult labour and delivery of postmature fœtus with hard and unmouldable skull.

1956. Neonatal death, at 23 hours from pneumonia. Induction-delivery interval 68 hours. Oxytocin infusion for 42 hours, forceps delivery. This patient was not given antibiotic cover after the induction, and the pneumonia from which the fœtus died may have been contracted in utero.

1. *Brit. med. J.* 1957, ii, 1021.

Factors which make the induction of labour safe for the postmature fœtus would seem to include:

1. Routine antibiotic treatment for the mother from the day after induction until delivery.[1]

2. Induction by low, in preference to high, amniotomy.

3. Not delaying induction beyond the 42nd week.

4. The use of oxytocin (not 'Pituitrin') intravenous infusion (not frequent small injections), with a tocodynamometer to assess the uterine response so that the infusion-rate can be suitably adjusted, to supplement or proceed amniotomy in all patients for whom the oxytocin-sensitivity test indicates that the uterus is insufficiently irritable to respond to amniotomy alone.

5. Giving attention to early signs of fœtal distress and not allowing the labour or induction to be prolonged if there is meconium or abnormal slowing of the foetal heart-rate. This entails 4-hourly observations on the fœtal heart—$^1/_2$-hourly if the maternal blood-pressure is raised, and $^1/_4$-hourly during oxytocin-infusion treatment.[2]

These figures show that induction can be a safe and life-saving procedure by avoiding excessive postmaturity. It can save more lives than Mr. Gibberd gives even the perfect method credit for. This may be because these babies have an average weight in the 8 lb. region and good ability to survive provided they are saved from prolonged anoxia and the dangers of a difficult delivery.[3] In his opening sentence Mr. Gibberd postulates anoxia as the basis of fœtal death in postmaturity. Is it not possible that size and rigidity of the head could increase the danger of delivery too?

University College Hospital,
London, W.C.1. C. N. SMYTH.

SIR,—Mr. Gibberd's paper advances our knowledge regarding the management of postmaturity. In trying to gain a familiarity with the problem I examined some 11,000 consecutive case-records. I found that the stillbirth-rate rose steadily from 1·47% in patients delivered at the 40th week, to 9·3% when pregnancy had lasted 44 weeks or more. In this latter group asphyxia was a *possible* cause of almost 80% of the stillbirths. In half of these cases, however, death did not take place until labour had lasted more than 48 hours; and it may be argued that prolonged labour rather than postmaturity per se was the cause of the asphyxia, and further that the cause of death in some of these may well have been intrauterine infection of the foetus and not asphyxia at all.

By a less lucid reasoning than that of Mr. Gibberd I arrived at a similar answer—namely, that wholesale surgical induction of labour could not be expected to solve the problem. I feel, however, that greater emphasis might be placed on the point that it is in the very group of patients we are trying to treat that induction is most likely to be unsatisfactory and dangerous.

If, for example, we knew at the 41st week that, in the absence of interference, labour in a particular case would not begin for another 3 weeks, and if we made some attempt to explain why this should be so, we might suggest a mechanical reason such as malpresentation or disproportion, or we might say the cause was humoral in nature, or we might simply say that the uterus was not yet ready for action. In any case we might hesitate before rupturing the membranes since in such a patient we would not be surprised to find that labour was delayed in onset and inert in character. There is a considerably increased incidence of prolonged labour in postmature cases, and I believe the relationship to be one of common cause rather than of cause and effect. The common cause may be mechanical or it may be humoral.

When, to this contention, is added the consideration that it is not possible to preselect these cases, so that the operation must be performed unnecessarily in hundreds of others, the argument against induction of labour seems to be a strong one.

Cæsarean section may well be the key to the problem; and if we could find a means of detecting the diminishing oxygen reserve of the fœtus before the onset of actual asphyxia, its value would be immeasurably the greater in that it would then be neither too often employed nor too long withheld.

Nottingham. J. M. GATE.

SIR,—I was interested in Mr. Gibberd's article. Is it not fairer to say, however, that the choice is not quite so clear as his title suggests? Most infants that are lost from postmaturity are lost, if the mother is not induced, by anoxia, and die, as Mr. Gibberd points out, before, during, or immediately after labour. But if the mother is induced, although induction is a hazard, the cause of death is still anoxia in most cases. So the real choice is between death from postmaturity and death from postmaturity plus induction, the induction being a factor but not, necessarily, the main hazard.

In our department we have practised surgical induction as a fairly rigid routine when the pregnancy has gone 14 days past the expected date as far as we can possibly judge. During the past five years (1952–56) 607 consecutive surgical inductions have thus been done where the indication was simply term plus 14 and no other possible factor requiring induction was present. Our total fœtal loss, both of stillbirths and neonatal deaths, was 15, but 4 of these had congenital abnormalities incompatible with life. So there was a loss of 11 babies—or 1·8%. All 11 (compare Mr. Gibberd's table II) died from anoxia.

Now, granting that surgical induction played some part, I nevertheless disagree emphatically with Mr. Gibberd when he says that in uncomplicated cases it is, possibly, better to avoid the treatment of postmaturity altogether, rather than to embark on a rigid policy of prevention. Can a loss of 1·8% over a large number of patients be lowered by those who never do a surgical induction for uncomplicated postmaturity? Mr. Gibberd's figures (table I) show that at 43 weeks the infant loss is 2·8% and at 44 weeks 4·3%. Why should it be assumed that these 11 babies would not have perished from anoxia if allowed to go on and on in utero until the natural onset of labour? We realise that even some of these 11 that we lost might have been saved by earlier intervention with a section, which is now our practice, according to the merits of the case, at the onset of meconium or the finding of scanty or absent liquor, both of which findings are hidden from those who have not ruptured the membranes.

Marston Green,
Warwickshire. G. S. LESTER.

INFLUENZAL ENCEPHALITIS

SIR,—Dr. Dubowitz's account (Jan. 18) of two cases of infective encephalitis recalls a case in my practice.

On Sept. 20, 1957, a boy, aged 13, fell ill with aching, shivering, headache, and stuffiness of the nose. He had no cough or pyrexia. By Sept. 26, deafness, due to eustachian catarrh, had developed, but there was no evident otitis media. While his siblings and mother were in bed with influenzal symptoms and his grandmother delirious from influenzal bronchopneumonia, he became severely ill with shivering, sore throat, weakness of the legs, delirium, headache, vomiting, and cough. At no time did I find any signs in his lungs. His temperature was 104°F, face and eyes were bright red, and meningism was present (stiff neck and straight leg raising only

1. Bound, J. P., Butler, N. R., Spector, W. G. *Brit. med. J.* 1956, ii, 1191, 1260.
2. Dumoulin, J. G., Martin, J. D. *J. Obstet. Gynaec., Brit. Emp.* 1957, **64**, 123.
3. Karn, M. N., Penrose, L. S. *Ann. Eugen., Lond.* 1951, **16**, 147.

to 30°). His temperature was normal, but he felt as though he was rotating, and as though iron bars were lying on his legs. He had obvious nystagmus to both sides and past-pointing to the right. No cranial nerves were affected. Supinator- and triceps-jerks were not obtainable. Biceps-jerks and knee-jerks were present and, on reinforcement, ankle-jerks. On Oct. 6 meningism was still present; on Oct. 8 the tongue deviated well to the right; and on Oct. 10 the palate deviated to the left.

I last saw him on Oct. 14 when he was almost well, but still showed nystagmus. He was treated symptomatically throughout.

Though pathological tests were not made in this family, the general pattern was similar to that in other simultaneous cases in which influenza virus A was found on cultivation and by complement-fixation tests.

Ilford, Essex. R. N. COMPTON SMITH.

RADIATION HAZARDS IN PELVIMETRY

SIR,—Dr. Lindsay's [1] letter comes as a timely reminder that radiation hazards need not outweigh the advantages of cephalopelvimetry, provided that due precautions are taken, and his ingenuity in screening appears to be a worthy safeguard.

From an historical standpoint he might have given credit to Chassar Moir [2] (in addition to Blair-Hartley [3]) for emphasising the dangers of the " brim view " in 1956. Indeed, the former should also have special mention for being 10 years ahead of his time in this regard by observing in 1946 [4]:

" There is another objection to the use of the standard method (Brim view) . . . the fœtal part occupying the uterine fundus—normally the breech—receives excessively heavy exposure and one which, for all we know, may be harmful to the fœtus ".

In congratulating Dr. Lindsay I wish that his ingenuity could remedy two further hazards of cephalopelvimetry—namely, reliance upon radiological predictions of the outcome of labour, and the accoucheur who is unable to rely upon his radiological interpretations of cephalopelvimetry.

Department of Gynæcology and Obstetrics, University of Natal, Durban. DERK CRICHTON.

TOBACCO-SMOKING

SIR,—You clearly disagree (Jan. 4, p. 32) with my use of intimidation in curing smoking (though you admit that it may be successful) and you regard persuasion as the only permissible psychotherapeutic instrument.

I have often presented the case against the smoking of tobacco persuasively and smokers have expressed their agreement about the utter undesirability of smoking in such terms as " I couldn't agree with you more ". Yet not long afterwards they have almost invariably lit up! My long experience of curing smoking in fact suggests that in a high proportion of cases persuasion and reason are not enough; because, where his drug is concerned, the addict is not, as a rule, reasonable. It is usually necessary to " get at him " emotionally as well as convince him rationally. Fear is the great protective emotion and should surely be utilised to protect the individual from lung cancer and other complications of smoking. Is it right to withold any highly effective psychotherapeutic agent in the intractible and still increasing disease, tobacco-smoking? Some smokers may resent its use, but some smokers even resent the putting up of non-smoking notices on a minority of railway compartments, judging by the way these are frequently mutilated.

My problem is usually one of scaring smokers enough to cure them. I scrupulously avoid overstatement except provocatively, when I try to make this obvious. Over the past 8 years the public has been given a sporadic series of " inoculations " with inadequate doses of lung-cancer scare. The result is that most smokers have acquired such a degree of immunity that they are almost unscareable.

Wallasey, Cheshire. LENNOX JOHNSTON.

SYRINGES: CLEAN OR STERILE?

SIR,—Dr. Jackson (Jan. 18) deserves warm approval for having taken so much thought and trouble about his syringes. His hospital also is to be congratulated on its willingness to cooperate with a general practitioner in his attempt to use only sterile syringes in his practice. However, when Dr. Jackson says that his syringes inside screw-capped metal containers are " autoclaved for me at my local hospital " I hope that he does not mean this literally. Syringes in such containers will not be sterilised by autoclaving but only by baking them in a hot-air oven.

Department of Bacteriology, University of Glasgow. J. W. HOWIE.

SIR,—The problem of syringe sterilisation in general practice is a difficult one, and there is no doubt that unsterile syringes are frequently used. In spite of this, accidents are relatively uncommon.

The method of sterilisation mentioned by Dr. Jackson in which the syringe is assembled, placed in a screw-capped metal container, and autoclaved, is not really satisfactory. The steam may not penetrate into the container and certainly does not reach the plunger of the syringe; the heat is not acting for long enough to penetrate the container and the syringe-barrel, and the plunger is almost certainly not sterilised.

Syringes should be sterilised in a hot-air oven in which they are kept at 160° C for 1 hour. Alternatively they can be sterilised by infra-red rays, as recently described by Darmady et al.[1]

Cuckfield Hospital, Haywards Heath, Sussex. R. W. P. JOHNSON.

LONG-TERM TREATMENT WITH ADRENOCORTICAL HORMONES

SIR,—The interesting paper by Dr. Davis and Dr. Popert in your issue of Jan. 4, emphasises the dangers of reducing or stopping cortisone therapy prior to operation. Although cortisone and its analogues have been in general use in this country for some years there is still, in the minds of many physicians, practitioners, and surgeons, an insufficient appreciation of the drastic effects which may follow such reduction or cessation. Patients who have been on steroid therapy for more than a few days may suffer acute exacerbation of their pre-existing condition when it is stopped and to this may be added symptoms suggestive of adrenocortical exhaustion. For some time we have told patients of this danger and warned them against stopping therapy without instructions.

Patients on insulin for diabetes mellitus have known for many years the dangers of stopping their treatment in the face of infection or gastrointestinal attacks. Nevertheless, they still do so occasionally under the impression that if they are taking no food, no insulin is required, and these are the cases one still sees sent to hospital in diabetic coma or precoma.

The rheumatoid arthritic when he experiences an acute gastrointestinal attack also tends to discontinue all treatment until his nausea and vomiting stops and it is again in these

1. Lindsey, D. W. *Lancet*, 1957, ii, 1068.
2. Moir, J. C. *ibid.* 1956, ii, 99.
3. Blair Hartley J. *ibid.* p. 46.
4. Moir, J. C. *J. Obstet. Gynæc., Brit. Emp.* 1946, **53**, 492.

1. Darmady, E. M., Hughes, K. E. A., Tuke, W. J. *J. clin. Path.* 1957, **10**, 291. See *Lancet*, 1957, ii, 1155.

cases that we see the cortisone withdrawal syndrome in its most flamboyant form.

In our unit we give written instructions to patients and send a copy to their practitioners emphasising that steroid therapy must not be interrupted and that if the patient cannot take his tablets by mouth during an episode of acute gastric enteritis, cortisone must be given intramuscularly. Should an operation be necessary, dosage of cortisone must be stepped up before, during, and after the operation, for surgical operations are a form of stress and all forms of stress call for increased dosage. We have recently seen cases of peripheral neuritis developing after suddenly stopping steroid therapy and several severe and even fatal cases of withdrawal syndrome are on record as quoted by Dr. Davis and Dr. Popert.

All this has been well described and emphasised for some years but the fact remains that these points are perhaps not sufficiently widely appreciated even today, and Dr. Davis and Dr. Popert's article is, therefore, both timely and important.

London, S.W.1. F. DUDLEY HART.

MEDICAL PRACTICE IN A CHANGING SOCIETY

SIR,—It is with dismay and despair I read Sir Francis Fraser pontificating in his article in your issue of Jan. 18.

Of course, we would like to have a secretary and a receptionist to do our non-medical work. Of course, we would prefer to improve our standard of care by spending more time on fewer patients. How is this to be done when we are paid seventeen shillings and sixpence a year for our five or six items of service, working out at half a crown or three shillings a time? A plumber who came on a Sunday, a few weeks ago, to unblock a drain demanded a pound before starting work—a not unreasonable fee—but let Sir Francis realise, we are valued by the State at no more than one-eighth the worth of a plumber.

It makes us smart to be told that we must try and do better medicine, when we cannot produce a higher standard of care unless we are adequately paid to do so. We have to pay our rent and our children's school fees. The Government has appointed a Royal Commission, and our two-year-old pay claim—the first since 1951—has been ignored. The heartbreaking delay has been perpetuated, and there seems little likelihood of any pay increase and implementation of Sir Francis Fraser's pious suggestions for a decade or more.

London, W.2. P. F. KENNISH.

REGULATION OF BODY TEMPERATURE

SIR,—I was interested to learn from the recent contribution of Sir George Pickering (Jan. 4 and 11) that the relatively high temperature of the rectum suggests that it may be a source of heat production by bacterial metabolism in fæces. Some evidence of heat generated from this source has been found in the temperate species of tortoises which are at present being studied.

With low environmental temperatures torpidity is induced which results in hibernation and it is not of uncommon occurrence that specimens with any considerable amount of fæces in the upper part of their rectum will after several weeks of hibernation awaken although the environmental temperature is below that permitting comfortable voluntary activity. On the other hand, specimens which have a comparatively empty rectum do not usually awaken. Presumably the bacterial metabolism which is thermogenic raises the body temperature of small individuals to that required for voluntary activities. We find that with adult specimens with a loaded rectum there is seldom awakening from hibernation, as probably it is a greater task to warm a larger body by this source. This latter observation suggests that awakening from hibernation is not a result of any perineal sensation which induces defæcation.

Unfortunately it has not as yet been possible to record the amount of heat evolved by the fæces while within the body, but it appears that a juvenile specimen hibernating with a loaded rectum will, in a period of between four and seven weeks, at an external environmental temperature of 11°C, have an anal canal temperature 4°C above that of a specimen with an empty rectum. This and related problems are to be investigated.

The rapidly changing immediate environmental conditions within the rectum of any animal, including man, will unfortunately never give a reliable temperature reading for any given period. The belief of Mead and Bonmarito [1] is that the temperature of any region depends on the metabolic activity of the region; the temperature and amount of blood flowing through the region and the gradients of temperature to surrounding regions will never allow the rectal temperature to be as precise as some have in the past thought. This would apply to all parts of the body for there is no organ, tissues, or cells which have the same metabolic activity all the time.

Zoological Society of London, London, N.W.1. TIMOTHY J. HUNT.

SIR,—I read with great interest Sir George Pickering's excellent and thought-provoking articles.

He mentions that "the considerable interval between the entry of endogenous pyrogen into the blood-stream and the onset of fever suggests the formation of a further intermediate substance." "Considerable interval" is rather vague and I wonder what the actual figures were. It is often observed that patients have rigors soon after starting intravenous fluids, in spite of adequate aseptic precautions; this is in all probability an unknown pyrogen reaction. My limited observations of treatment with intravenous T.A.B. vaccine, in gradually increasing doses, suggest that rigors almost always start in 15–30 minutes or not at all. Is this a considerable interval for the formation of an intermediate substance?

Victoria Hospital, Accrington. S. S. JHAVERI.

INFANTILE GASTROENTERITIS

SIR,—Dr. Librach (Jan. 11) appears to have missed the point of our article (Dec. 14). Infantile gastroenteritis due to *Escherichia coli* is a specific disease with known high infectivity. Careful bacteriological examination of the stools to exclude the known pathogenic serotypes of *Esch. coli* in a case of infantile diarrhœa and vomiting is essential before one is entitled to consider the ill-defined field of infantile digestive disorders. Our experience suggests that many cases which on clinical grounds appear to be of the non-infective type actually prove to be mild cases of infective gastroenteritis.

Mild cases of infantile gastroenteritis due to *Esch. coli* treated at home often do well without any antibiotics at all. In hospital the problem is somewhat different and the need for treatment of proved cases falls into three categories:

(*a*) Where the clinical condition warrants it (all severe cases and many of the intermediate group). In severe cases we consider that antibiotic therapy should be started as soon as a stool sample has been obtained, and before the results are available.

(*b*) Those cases from institutions and nurseries where negative stools are required before discharge.

(*c*) Mild cases from their own homes in order to reduce the chance of cross-infection. It is in this last category that opinions may vary.

Treatment on these lines is surely not "indiscriminate antibiotic therapy".

1. Mead, J., Bonmarito, C. L. *J. appl. Physiol.* 1949, **2**, 97.

We were surprised that Professor Watkins (Dec. 21) is "not impressed with the therapeutic effectiveness of antibiotics", but perhaps he was referring to all grades of severity. In severe cases the ease of treatment and the rapid recovery bear no comparison with the difficulties encountered before the advent of antibiotics.

Infantile gastroenteritis should be treated on the knowledge of the bacteriological facts and not on clinical impressions. It would avoid confusion if this term was used only in those cases in which known serotypes of *Esch. coli* were isolated.

Hither Green Hospital,
London, S.E.13.

E. H. BROWN
E. H. BAILEY.

A FUNCTIONAL NECESSITY

SIR,—Mr. Murley's letter in your last issue seems more concerned with attacking the Regional Board and its officers than attempting to deal with the extremely difficult problem of medical staffing in the hospitals. As he quotes from correspondence with the Board, your readers will be interested to see, in full, the request which he made for information to be supplied to the Medical Committee. This was :

1. The numbers of consultants and S.H.M.O.s in the various specialties at present working in the region.
2. The number of requests for additional consultant staff received from hospital management and/or medical advisory committees since 1948.
3. The number of such requests which the Board has been (*a*) able to fill, or (*b*) unable to advertise.
4. The number of additional consultant appointments made by the Board without specific request from the periphery.
5. The number of requests for additional consultant appointments or additional sessions, emanating from management committees or medical advisory committees which the Board has not agreed to.
6. The number of requests for additional consultant appointments, &c., which the Board has not been able to advertise owing to financial stringency. (It being presumed that the Board would like to have made these appointments had the money been available.)
7. The number of S.H.M.O.s who are performing consultant work.
8. The number of senior registrars who are "time expired" and seeking consultant appointments.
9. Finally, may the medical committee please be supplied with details of any investigations of the medical needs of the region which have been undertaken by representatives of the Board, the Ministry or any other group which has looked into this matter.

Mr. Murley quotes only an extract from the written reply. The reply forwarded to him in fact reads as follows:

"The information requested by him would be most difficult to assemble and would involve a close examination of all the Board's records on medical staffing since 1948—this in itself would be a major undertaking. It would then be necessary to analyse them in some detail and the result would still not be satisfactory since in many cases, it would be a matter of opinion as to the net effect of a particular line of action by the Board.

"Quite apart from this, the Board's staff is so sorely pressed at the present time, that to embark on this project for Mr. Murley would be quite impossible."

This difficult question of the most appropriate medical staffing of the hospitals has been concerning the medical staffing subcommittee of the Board's Establishment Committee for a considerable period of time. This subcommittee consists of six members, five of whom are medical.

On Oct. 16, 1957, the Board sent a deputation to the Ministry of Health asking that most urgent consideration should be given to a number of problems affecting medical staffing, particularly one arising out of the present difficulty over senior registrars, and suggesting a number of solutions. The fact that the Ministry of Health have not so far been able to meet the Board in the suggestions which it made, is perhaps due to the intractable nature of the problem as between the Ministry of Health and the profession as a whole.

North West Metropolitan Regional
Hospital Board,
11a, Portland Place, London, W.1.

COTTESLOE
Chairman.

MANIPULATION FOR BACKACHE

SIR,—Mr. Bremner (Jan. 4) defines lumbosacral strain as a chronic localised disc degeneration with associated derangement of the corresponding posterior joints and ligaments from which pain presumably arises; in the early stages it is a subluxation or instability of the posterior joints with associated ligamentous strain and in later stages a true osteoarthritis. (Nerve-root involvement and general spondylosis are excluded.) The long-term management is arranged as follows:

(1) If seriously disabling: spinal fusion.
(2) If not seriously disabling:
  (*a*) Reassurance and advice on how "to live with their back", if intelligent.
  (*b*) Manipulation for the average hospital patient because he expects something more "positive" than reassurance and advice, and if not given manipulation he will seek it elsewhere.

The reasons given for manipulation under (2*b*) have no foundation in pathology and could equally well be put forward as arguments for treating with strapping, plaster, corset, local anæsthetic, cortisone, or even an X-ray! As "a priori" arguments for manipulation, they have no value. In addition there is nothing in Mr. Bremner's concept of the pathology to justify manipulation. If manipulation is to have any objective value as distinct from psychological it must mean either a purposeful and enduring correction of a derangement or the restoration of all or part of a range of movement lost through adhesions. It would seem that Mr. Bremner realises all this and he attempts to justify the use of manipulation on the purely empirical grounds that it produces "satisfied customers" without having any scientific explanation for this.

Given the pathology as described by Mr. Bremner I cannot understand how 25 of his 250 cases obtained dramatic relief from (presumably) a single manipulation (unless the result was due to the subsequent physiotherapy). I find it much easier to understand why 61 of his patients found relief only in a lumbosacral corset.

I make these observations not in criticism of Mr. Bremner's article, since he is assiduously careful to avoid making any claim to diagnose with scientific evidence any derangement of the lumbosacral region which he would profess to be able to purposefully correct by a specially designed manipulative procedure. My disagreement is rather with those who advocate a practice which implies such a claim. Of this school of thought I would ask:

(1) What precisely in anatomical terms do you attempt when you manipulate? It seems to be more generally the hypothesis that there is a derangement rather than adhesions.

(2) How do you achieve a precise correction of a unit of the intricate lumbosacral complex by a manœuvre exercised on the exterior of the trunk? I can diagnose with X rays a dislocation of the fifth cervical vertebra on the sixth cervical vertebra and reduce it by a manœuvre based on a knowledge of the method of production of the derangement and check my result by X-ray examination, but I cannot practise in this manner on hypothetical derangements of the lumbosacral-joint complex for which I have no objective evidence.

(3) Is it right that throughout the country practitioners should manipulate "slipped discs" if many of them have no personal experience of the nature of a protrusion of the nucleus pulposus as seen at operation? Of some hundreds of disc protrusions I have seen at operation I have never seen one that could be reduced by manipulation. Perhaps it is only the

irreversible discs that come to operation. What evidence is there for disc protrusions reversible by manipulation? I know of no acceptable scientific evidence for this.

War Memorial Hospital, Scunthorpe. DAVID F. THOMAS.

SIR,—Mr. Bremner is to be congratulated on the successful disposal of a high proportion of chronic-backache patients by manipulation. May I, as a general practitioner, who has to live with the "patient who has to live with his back" comment on some aspects of his report.

(1) The sole criterion used in this series is the patient's subjective complaint about his back, both before and after treatment. There is no indication that information about the person complaining of his back would be of any use here; this is the exact antithesis to the modern ideal of treating the patient and not the illness. Bomford,[1] in his Bradshaw Lecture of 1952, gave an amusing analysis of his own chronic backache, which might aptly be re-read by those who deal with "chronic backs".

(2) The results reported are the immediate (one to two weeks) after-effects of the treatment; surely, in chronic conditions the long-term results are of more interest.

(3) It is assumed that, as no attempt is made to "sell manipulation", psychological influence as such is excluded. This, however, is doubtful. Note how Mr. Bremner comments "manipulation is the most convincing" to the patient, and if not offered this treatment the patient "may well seek it elsewhere". Treatment, therefore, should be "definitive" for this "nuisance disease".

I feel confident that psychologists will recognise in this type of language familiar patterns of powerful unconscious needs in both patient and therapist. General practitioners, too, will recognise similarities to their own dealings with assorted chronic complainers. In short, it is probable that important psychological factors are at work here and can be ignored only at the risk of a loss of clarity in the results. It may well be that the diversity of opinions about so pragmatic a treatment as manipulation is due to disregard of psychological factors.

(4) This suggests a possible control experiment in the course of such routine work, by omitting the manipulation in every second anæsthetised patient. It would be wise, however, to seek the aid of a psychologist in organising such work.

London, W.13. A. LASK.

CANCER OF THE BLADDER IN CHEMICAL WORKERS

SIR,—We were surprised to read a statement, in the Report for 1956 of the Ministry of Health,[2] on bladder cancers of chemical workers, which we think is misleading without fuller explanation. We have drawn attention to this and the department of the Ministry of Health concerned agrees that some clarification is desirable.

The statement referred to, about cancers, is:

"Some, such as the scrotal cancers of chimney sweeps and mule-spinners, the bladder cancers of chemical workers and the bone cancers of workers with luminous paints have been so far elucidated that, for practical purposes, they have been prevented and eliminated."

A statistical survey,[3] published in 1953, has led to changes in industrial practice that may, if they have been well planned, be expected to diminish the hazard in the future. The nature of occupational cancer is, however, such that we should expect many cases to occur during the next 20 years in men who were exposed to risk prior to the changes in industrial practice, even if the precautions taken were completely effective; and very few, or no, cases for about 7 years among men exposed to the new conditions if the precautions are not completely effective. The effectiveness of the precautions can, in the long run, only be assessed by a further statistical survey made in about 10 years' time.

The Association of British Chemical Manufacturers' report [3] used the following terms: "... there are now solid grounds for thinking that the practical steps already taken and being taken will successfully overcome the hazard. The abandonment of beta-naphthylamine manufacture alone should go an appreciable way to achieve this end. The introduction of new plant design and operation together with general improvement in factory hygiene should also greatly increase the margin of safety with the other carcinogens." An incomplete appreciation of the situation thus described may have led the Ministry of Health to indulge in optimistic prolepsis.

The possibility of the introduction of new bladder carcinogens into the chemical industry (and other industries) must be borne in mind. Already xenylamine (4-amino diphenyl) has produced human bladder cancer in the United States.[4]

A search of death certificates relating to workers in chemical occupations where bladder tumour is mentioned amongst the recorded causes of death does not show any falling off in the annual number, 17 being found in 1955 and 16 in 1956. The mean annual numbers for 1945-49 and 1950-54 were, respectively, 13 and 15. These figures do not support the suggestion that "for practical purposes they (bladder cancers in chemical workers) have been prevented and eliminated." (Parenthesis inserted.)

Chester Beatty Research Institute, Institute of Cancer Research, Royal Cancer Hospital, London, S.W.3. E. BOYLAND
R. A. M. CASE.
Royal Marsden Hospital, London, S.W.3. D. M. WALLACE.

POSTOPERATIVE VENOUS THROMBOSIS

SIR,—I welcome D. Rivlin's letter.[5] It is sad to read that "it is extremely doubtful whether the incidence of postoperative venous thrombosis is diminishing." That this proves that early ambulation has been a failure would be a very erroneous conclusion. The real motive of early ambulation seems to have been grasped by very few people. Much thrombosis is of necessity present after operation or childbirth. It is the spread of this process into adjoining streams that must be prevented and, unfortunately, most of the conditions favouring this spread are present after operation; foremost among these is the slowing of the blood-stream which allows the platelets to silt out and set into action the process of clotting. This blood-clot is inside an undamaged vein, is not firmly adherent, and is easily detached.

The rate of flow can be increased by muscular activity and by antigravitational methods. Gravity is counteracted by raising the foot of the bed about 9 in.; and ankle and knee exercises in bed or walking will increase muscular activity. Not all patients are fit to get up soon after a major operation, yet many enthusiasts impose this as a rigid routine. For such people, far more benefit would be gained by knee and ankle movements in bed for three minutes in every hour, than by getting them up. In fact, the latter can surely be harmful when the patient is frail and in considerable discomfort, and especially so when she has merely been lifted into a chair for some five minutes and then lifted back again. As Dr. Rivlin says, this is often described as early ambulation. There is no ambulation, and in fact the venous return is less efficient than it is in bed with the foot raised. I would utter one other word of warning, against the increasingly popular practice of half the ward sitting around the fire together for most of the evening. Psychologically, this may be beneficial, but patients allowed the privilege should be warned that it is only on condition that they do frequent knee and ankle exercises.

1. Bomford, R. R. *Brit. med. J.* 1953, i, 633.
2. Report of the Ministry of Health for the Year ended 31st December, 1956. Part II. On the State of the Public Health; p. 103. H.M. Stationery Office, 1957.
3. Association of British Chemical Manufacturers. Papilloma of the Bladder in the Chemical Industry. London, 1953.
4. Melick, W. F., Escue, H. M., Naryka, J. J., Mezera, R. A., Wheeler, E. P. *J. Urol.* 1955, 74, 760.
5. Rivlin, S. *Lancet*, 1957, ii, 1290.

Thrombotic complications are four times as common in gynæcological operations. Surely this is because movements of lower limbs cause much more discomfort after lower abdominal operations and certainly after perineal operations; immobility is the inevitable result.

The peak of post-operative thrombosis is at about the tenth to twelfth day, and this coincides with the highest levels of platelet-count, platelet adhesiveness, and plasma prothrombin; a plea is long overdue, therefore, to aid venous return from the legs after operation for at least two weeks. This should be achieved by exercises, bed raising, and, of course, early ambulation if the conditions are suitable.

London, N.W.1. E. R. REES.

OSTEITIS PUBIS

SIR,—I recorded [1] in 1953 that this condition may be found in about 4% of the "rheumatoid" affections of the skeleton, following trauma or sepsis associated with any operations on pelvic structure, and may have more serious extensions than described, for infection of the periosteum may lead not only to the radiographic signs in the symphysis but to signs of ischial bursitis, septic arthritis of the hip, or sacro-iliac joints. Though it is often the baffling, painful, and tiresome complication described by your correspondents (Jan. 8), it may be painless when first discovered by X-ray examination and may end in fusion at the affected joints, chronic arthritic changes, or, more fortunately, complete resolution.

Birmingham. JAMES F. BRAILSFORD.

THE CHECK-VALVE MECHANISM AND THE MEANING OF EMPHYSEMA

SIR,—Consideration of the ætiology of diffuse hypertrophic emphysema has for long been a powerful stimulant to speculation, and the multiplicity of hypotheses emphasises, as a kind of Volker's Law, that we do not know the answer. Two types of mechanism may, separately or together, be causative: firstly some change in the alveolar wall making it more liable to damage and rupture; and secondly an excessive strain to which "normal" alveoli are subjected and which overinflates and permanently deforms them. In his paper in your issue on Jan. 11, Dr. Lister argues convincingly that diffuse hypertrophic emphysema is usually preceded by bronchitis and bronchospasm. There is, however, little experimental evidence to support his conclusion that there is a widespread check-valve mechanism (allowing air to enter pulmonary units but not to leave) and that these units first become overdistended and then emphysematous. It is important to state the difficulties in accepting this view.

It should first be emphasised that a *uniform* diffuse condition cannot cause overdistension of the airsacs, since the distension must remain within the limits of a person's vital capacity and "healthy alveoli cannot be ruptured by any physiological range of pressure". But if only some pulmonary units have check valves then we have to find a mechanism which will overdistend these but not adjacent alveoli. The amount of air entering an airsac will depend mainly on three factors: the pressure-drop through the air passage, the resistance to flow through the airway, and the stiffness of the alveoli beyond. It is fundamental to the mechanical explanation of emphysema that, in the first instance, the alveoli are of normal stiffness (or compliance, to use current terminology); but even if it is not constricted, a bronchiole or alveolar duct with a check valve will almost certainly have greater resistance to air-flow than a normal bronchiole, unless one regards the valve as similar to a pea in a whistle. Furthermore, if the valved unit becomes distended the pressure-drop tending to inflate it will be less than for adjacent unvalved units. In other words the "normal" airsacs will be ventilated to a greater extent than the valved ones, which can only be inflated to the maximum static elastic pressure of the lungs which we know they can withstand without rupture.

Dr. Lister thinks it more likely, however, that the valved units are overinflated by positive pressure within the large airpassages in coughing, "as in pumping up a tyre". But the intrapulmonary pressure must rise with the intratracheal pressure in the expiratory phase of coughing, so that there is no pressure-drop to pump air into the alveoli. Even were there such a force it would tend to overinflate "normal" units rather than valved ones, for the reasons given above. Furthermore, if the entire contents of the air-passages (150 ml.) could in some way be pushed into the alveoli (2500 ml.) this would cause little extra distension.

There are three possibilities which might resolve the problem:

(1) If in the initial changes in diffuse hypertrophic emphysema some alveoli are so damaged as to be less stiff (more compliant) than others, these would then tend to overinflate; the mechanical factors would then be secondary to earlier structural changes, and it is not necessary to incriminate check valves to explain progress of the disease.

(2) If units containing check valves have a lower resistance to air entry than "normal" units. It is difficult to conceive such a mechanism, and if, as one suspects, the contrary is true the mechanical forces described above would tend to distend "normal" alveoli rather than valved ones.

(3) If the alveolar walls are damaged by maintained pressures which do not cause harm when applied transiently in normal breathing. Such pressures might be found beyond check valves in the early stages of emphysema.

These are theoretical considerations, but the possibilities described above should be susceptible to experimental test. In the meantime, the evidence for a check-valve mechanism in the early stages of diffuse hypertrophic emphysema is very largely based on speculation, and it is important to emphasise the difficulties inherent in this theory.

Department of Physiology, St. Bartholomew's Hospital Medical College, London, E.C.1. G. C. R. MORRIS J. G. WIDDICOMBE.

INCIDENTAL DANGERS OF X-RAY THERAPY

SIR,—Not only the electrocardiographic changes mentioned in your leading article of Jan. 4 but also actual cardiac infarction may follow therapeutic irradiation of the thorax. Although the myocardium resembles skeletal muscle in its resistance to X-ray damage small and medium arteries are sensitive and can become occluded by the intimal proliferation described by Tricot et al.[1] or perhaps by a similar fibrinoid necrosis to that observed by Professor Wilson and his colleagues (Jan. 4), in the kidney.

In two cases under my observation extensive infarction occurred six months after irradiation.[2] The attacks were of great severity, accompanied by disturbances of conduction, and were followed by a degree of clinical and electrocardiographic recovery that one could not expect after atheromatous occlusion. Both patients were women under 50 who had had no previous angina.

The long interval is interesting in the light of Professor Wilson's finding of delayed structural changes in the kidney

1. Brailsford, J. F. Radiology of Bones and Joints. London, 1953.

1. Tricot, R., Baillet, J., Helmke, G. *Arch. Mal. Cœur*, 1954, **47**, 922.
2. Pearson, H. E. S. *Proc. R. Soc. Med.*, 1957, **50**, 516.

and corresponds with that elapsing before the post-radiation mediastino-cardiac reaction of Blemenfeld and Thomas [3] and Rose and Wolferth.[4] It may well obscure a relationship that is commoner than either radiotherapists or " the neighbours " realise.

Whittington Hospital, London, N.19. H. E. S. PEARSON.

INTRATHECAL PHENOL FOR INTRACTABLE PAIN

SIR,—The report by Dr. Nathan and Dr. Scott in your issue of Jan. 11 corresponds closely with the results obtained during the past year in Edinburgh using a 7½% phenol-'Myodil' solution.

As with their material, necropsy has revealed no changes in the spinal cord, its coverings, or nerve-roots which could be attributed specifically to the effect of the injected material.

However, 4 patients had their spinal cords exposed at the site of injection within two to four weeks of the injection and each showed a marked localised arachnoiditis. Over a distance of about two inches the arachnoid was quite opaque and pink, and adherent to the dura and underlying structures, making exposure of the spinal cord tedious.

So far, no patient subjected to this form of treatment has developed signs suggestive of a progressive adhesive or obliterative arachnoiditis following the injection, but until a sufficient period of observation has been completed it would seem to be prudent to restrict the intrathecal use of carbolic acid dissolved in myodil to the relief of pain of malignant disease.

Department of Surgical Neurology, Royal Infirmary, Edinburgh. ALLAN S. BROWN.

A PLASTIC APPROACH TO SURGERY

SIR,—It is surprising that Mr. Heanley (Jan. 11) as a plastic surgeon should advocate the making of incisions in the direction of Langer's lines; for in the face, where the best cosmetic result is particularly desirable, the line of election for a scar bears no relation to Langer's lines.

As Le Gros Clark [5] has pointed out:

". . . with the movements of facial expression, flexure lines appear momentarily in the skin at right angles to the pull of the fibres of cutaneous muscles. In other words, their pattern is determined by the arrangement of the underlying musculature. With advancing age, as the result of the progressive loss of the elasticity of the skin, these creases become established as permanent wrinkles."

The illustrations of Kraisse [6] have shown convincingly that at many points the direction of the lines of election and that of Langer's lines are at complete variance and it would appear that when they do coincide this is quite fortuitous.

The continued lip-service paid to Langer's lines in most surgical textbooks would suggest that these facts are not widely enough appreciated.

Royal Infirmary, Glasgow. IAN A. MCGREGOR.

CHRISTMAS QUIZ

DR. N. HOWARD-JONES writes:

" Supplementing Dr. Gurney Smith's correction (Jan. 4, p. 58) to the excellent Christmas Quiz provided by Dr. Ffrangcon Roberts, I would point out that the *St. Bartholomew's Hospital Reports* of (as far as I recollect) the 1870s contain a most amusing article by Robert Bridges on the casualty department of his hospital. The answers to the quiz contain another slip: 'Jesuits' bark' was not quinine, but the bark from which quinine and other cinchona alkaloids were subsequently isolated."

3. Blemenfeld, H., Thomas, S. F. *Radiology*, 1945, **44**, 335.
4. Rose, E., Wolferth, C. C. *J. Amer. med. Ass.* 1941, **116**, 2648.
5. Le Gros Clark, W. E. The Tissues of the Body; p. 277. Oxford, 1945.
6. Kraisse, C. J., *Plast. reconstr. Surg.* 1951, **8**, 1.

Obituary

JAMES COUPER BRASH

M.C., M.A., M.B. Edin., M.D. Birm., LL.D. St. And., D.Sc. Leeds, F.R.C.S.E.

Emeritus Professor Brash died at his home in Edinburgh on Jan. 19, at the age of 71. He was one of the great figures and personalities in British anatomy, and his death will cause many practitioners of medicine the world over to feel a deep sense of personal loss.

He was born in Helensburgh, and was educated at George Watson's College and Edinburgh University where he entered on an arts course. The knowledge of literature, philosophy, and Latin that he then gained formed the basis for his own philosophy of life. He recommended others to cultivate, as he himself certainly did, the tranquil mind, the quality of imperturbability and calmness in times of emergency. These indeed formed the theme of his promoter's address to the new graduates in medicine in Edinburgh in 1940.

After graduating M.A., Brash entered on a combined science and medical course in which he distinguished himself in many subjects and extracurricular activities. He was prominent in several student societies and became senior president of the Students' Representative Council. After graduating M.B. in 1910 he became house-physician in Edinburgh Royal Infirmary to the late Sir Thomas Fraser. In 1911 he joined the anatomy department of Edinburgh University as a demonstrator under the late Prof. D. J. Cunningham—and this connection was always a matter of pride to him. From Edinburgh he moved to the anatomy department at Leeds, but in 1914 he joined the R.A.M.C., and while with it served in France and Belgium, attained the rank of major, and was awarded the M.C. Returning to academic life he was later translated to Birmingham, where he became professor of anatomy and dean of the faculty of medicine. He was responsible for the planning of many of the developments that led to the formation of the new Medical School in Birmingham, and for such responsibility he was eminently well qualified. He succeeded Prof. Arthur Robinson in the chair of anatomy at Edinburgh University in 1931, and for 23 years he laboured ungrudgingly and without stint for his alma mater. His lectures were always most carefully prepared expositions of the subject with which he was dealing, and on occasions he was carried away by his own enthusiasm. He and the late Dr. E. B. Jamieson established a close and firm friendship that matured over the years, and they were co-editors of the 7th and 8th editions of *Cunningham's Text-book of Anatomy* and also were co-editors of two editions of *Cunningham's Manual of Practical Anatomy*. The last editions of the manual were, however, entirely Brash's work, and he was also sole editor of the most recent edition of the textbook.

His main scientific interest was the development and growth of bone, and his Struthers lecture on the subject in 1933 to the Royal College of Surgeons of Edinburgh is now regarded as a classical study. Much of his original work was associated with the growth of the jaws and palate, and he had a particular interest in the ætiology of irregularity and malocclusion of the teeth. The mechanism involved in the movement of the teeth during growth of the jaws always fascinated him and his madder preparations threw great light on the subject. His eminence as an anatomist was recognised by the Anatomical Society when he was elected president for 1945–47 and also by the Universities of St. Andrews and Leeds from which he received honorary degrees. His anatomical skill was brought to the notice of the general public through his researches and meticulous work in connection with the

Ruxton murder case, and he and Prof. John Glaister published a volume in 1937 dealing with the medicolegal and other scientific aspects of this case. In 1955 he published an important text on the neurovascular hila of limb muscles.

R. W., an Edinburgh colleague who migrated across the Firth of Forth, writes:

Professor Brash's interests were multiple and on golf course and in trout stream he showed the same enthusiasm as at work in his laboratory. His sense of pawky humour was a feature of his lectures and after-dinner speeches and through it he relieved the tenseness of many an examination. He was a man who always gave more than he received and in doing so gave himself great pleasure; students without number and graduates sought his counsel and advice knowing that in doing this they would receive an opinion that would be in their best interests. For over 45 years he owed much to Mrs. Brash and through her he came to have a deep love for St. Andrews and its University.

THOMAS KIRKPATRICK MONRO

M.A., M.D. Glasg., F.R.F.P.S.

Dr. T. K. Monro, emeritus regius professor of the practice of medicine in the University of Glasgow, who died on Jan. 10 at the age of 92, had won an honoured place in Glasgow by the kindliness and skill with which he served the city's patients and the learning and humanity which he offered the students in the city's medical schools. His interests as a physician and a bibliophile were happily joined in his famous collection of editions of *Religio Medici*.

He was born at Arbroath, where his father, Dr. William Monro, was in practice. After graduating M.B. from the University of Glasgow in 1888 he continued his medical studies in Vienna, Berlin, and Paris. Soon after his return to Scotland he became pathologist to the Victoria Infirmary in Glasgow. He had held the chair of medicine at St. Mungo's College and a clinical lectureship at the Royal Infirmary for over ten years when in 1913 he was appointed to the regius chair at the University.

His writings on his own subject included his *Manual of Medicine*, his *History of the Chronic Degenerative Diseases of the Central Nervous System*, and a monograph on Raynaud's Disease. His book on the *Physician as Man of Letters, Science, and Action* happily presented his profession to a wider circle of readers. He retired from his chair in 1936, and the following year the University of Glasgow conferred on him the degree of LL.D. Two years later the Royal Faculty of Physicians and Surgeons elected him to their honorary fellowship, an unusual distinction for one who had already served as their president.

The following tribute is taken from the address which S. A. gave at Professor Monro's funeral on Jan. 14.

Thomas Kirkpatrick Munro found his life work and his inspiration in the day-to-day care of sick people in the hospitals and homes of this city. A supreme master of the art of clinical practice, he enhanced the value of his skill by kindness born of compassion; and his whimsical sense of humour endeared him to his patients and to his students. He was an outstanding teacher—especially for those students sensitive to the great adventure opening before them in this realm where science merges into art. Acutely aware of the needs of the individual patient before him, it was nevertheless by a light more remote yet more vivid that he saw the detail of his task.

His skill and shrewdness and humanity at the bedside were the blossom of a fine intellect nurtured in the climate of true learning: he read his classics in the original and refreshed his mind with music, history, and mathematics; and in the twilight of his later years, though frail and blind, by the sense of touch he lived among his favourite authors and walked with greatness. He loved the open country, the wind and the rain; and while walking and angling he cherised the boon of solitude. Topics which might seem remote from the mind of a scholarly physician came within the ambit of his encyclopædic knowledge: he could startle the expert by dissertations on locomotive construction, and others he would entrance by his devotion to the circus. It would be a fitting tribute to his diverse accomplishments if they were to be recorded in his own book—*The Physician as Man of Letters, Science and Action*—for in these pages he reveals his affinity for the man of many parts. So notable and ardent a bibliophile inevitably grows into his books. The pages of the *Religio Medici* and *Christian Morals* were so close to Thomas Monro that he seemed to breathe the same air as Sir Thomas Browne, and with him might well have said—

> Some things are dictated for our instruction and some acted for our imitation . . .
> He honours God, who imitates him; for what we virtuously imitate we approve and admire.

CHIRANJI LAI PASRICHA

M.A., M.B. Cantab.

Lieut.-Colonel Pasricha, who died in London on Jan. 11, was a former director of the School of Tropical Medicine at Calcutta. From 1948 to 1955 he was medical adviser to the High Commissioner at India House, and he was often to be seen at scientific and social gatherings of doctors in London.

He was born in the Punjab, and educated at Leys School and Caius College, Cambridge, where he took a first in the natural sciences tripos. He qualified in 1920 from St. Bartholomew's Hospital, where he won the Shuter scholarship. Soon afterwards he passed into the Indian Medical Service and later saw service in China as well as in India. In 1933 he became professor of pathology and bacteriology at the Calcutta school. In 1939 he was awarded the Minto medal for medical research. His work included investigations into the treatment of cholera with the newer sulphonamides, and on choleraphage, snake venoms, epidemic dropsy, and sprue. He succeeded the late L. E. Napier as director of the school in 1945, and he also was superintendent of the Carmichael Hospital for Tropical Diseases in Calcutta. During the late war, he was A.D.M.S. at Army Headquarters, New Delhi, and at this time he largely rewrote the *Field Service Hygiene Handbook* (1945).

In 1948 he came to London as medical adviser to the High Commissioner for India. P. H. M-B. writes:

Pasricha was an admirable public-relations officer by reason of his friendliness, his accessibility, and his attraction to the British way of life, and adherence to its ideals as well as to those of Indian culture. It was always an experience to get into touch with him and thereby to imbibe some of his vigour and enthusiasm. At medical meetings his tall, erect military figure was welcome, and the benignant smile which lit up his face was indicative of the character of this popular man. He always remained a loyal friend of this country, a devoted and loyal son of Cambridge, and proud of his associations with St. Bartholomew's.

Appointments

CRAIGHEAD, ISOBEL B., M.B. Edin., D.P.H.: assistant M.O. (child welfare), Edinburgh.

Colonial Appointments:

BOYD, P. R. W., M.B. Lond.: M.O. grade B (institutions), Trinidad.
DASENT, L. E., M.B. N.U.I., D.T.M. & H.: M.O. grade B (institutions), Trinidad.
GEHR, A. E., M.D. Hamburg: M.O., leprosy service, Eastern Nigeria.
HOGERZEIL, L., M.O., leprosy service, Eastern Nigeria.
PYDIAH, S. R., M.B. Madras: M.O., Mauritius.
ROBERTSON, M. J., M.R.C.S., D.T.M. & H.: M.O., Hong Kong.
RUSH, S. V., M.R.C.S., D.O.M.S.: senior specialist, Federation of Nigeria.
WARD, J. R., L.R.C.P.E.: M.O., Kenya.

Notes and News

ONCHOCERCIASIS

AT a meeting of the Royal Society of Tropical Medicine and Hygiene in London on Jan. 16, Dr. A. R. D. ADAMS (Liverpool) opened a symposium on onchocerciasis with a short general account of the disease adding that he had seen only one instance of serious eye lesions in his considerable series of European cases.

Prof. A. W. WOODRUFF commented on the rarity of ocular lesions in Africans examined in Calabar, where almost all were infected with the disease. On the other hand eye lesions —mostly slight—were found in 12 out of 76 patients (72 Europeans) seen in London. Eye lesions might therefore be present in light infections and absent in heavy infections; possibly the high gamma-globulin content of the sera of Africans, so constantly exposed to multiple infections, provided a protection. It seemed that some other factor was needed to produce blindness. Onchocerciasis might be suspected if there was unexplained pruritus, rash, eosinophilia, or eye disease in persons from the endemic areas; and filarial complement-fixation test and skin tests were useful. Diethylcarbamazine would kill not only the microfilariæ but also the adult worms, if enough was given. This was disputed by Dr. F. HAWKING, who, though acknowledging the drug's great value against microfilariæ, did not find it lethal to the adult worms. For this suramin was necessary.

The strongest critic of the blindness concept was Mr. D. P. CHOYCE, who showed slides illustrating those lesions of the anterior segment of the eye which are admittedly due to onchocerciasis—keratitis commonly, iritis more rarely—but which in the Cameroons did not often lead to more than slight interference with vision. He did not think that this infection could cause cataract. The lesions of the posterior segment which caused blindness and which had been attributed to onchocerciasis—optic atrophy, retinal degeneration—were, he thought, probably of different ætiology, and there was no good evidence that they were onchocercal. Optic atrophy was caused by vitamin deficiencies, syphilis, and other conditions common in Africa, and the form of choroidoretinal degeneration seen there was remarkably similar to the hereditary diseases known in Britain and transmitted as a genetic dominant. Moreover, as microfilariæ of *Onchocerca volvulus* were not found in the blood-stream, it was difficult to understand how they could gain access to the optic nerves and choroid. Mr. Choyce concluded therefore that onchocerciasis was probably not a serious cause of blindness, though he admitted that it might have an adverse effect in trachoma, leprosy, and other affections of the eye.

Dr. W. E. KERSHAW (Liverpool) agreed with this general conclusion, on epidemiological grounds after investigations in the Cameroons. The anterior eye lesions were related to the intensity of infection but were not blinding lesions; but the incidence of posterior eye lesions, the blinding lesions, bore no relation to intensity of infection. Dr. R. S. BRAY reported work done in Liberia in which no blindness was found in a group of African onchocerciasis patients in whom there was much deficiency disease.

These arguments were not enough to shake the belief of several speakers who had lived in the onchocerciasis areas of West Africa. Dr. B. B. WADDY thought that heavy infections in childhood might lead to blindness in later life, and that onchocerciasis could cause cataract. Optic atrophy might possibly be related to extensive use of tryparsamide for sleeping-sickness. Lieut.-Colonel J. H. WALTERS recalled the high incidence of posterior eye lesions in peoples living near rivers, who left those parts on that account. Optic atrophy certainly might be due to syphilis, but that was commoner in towns than in rural areas such as those in which onchocerciasis flourished. Dr. J. L. MCLETCHIE pointed out that blindness was common in Northern Nigerian onchocerciasis areas, which were in a dry climate, but rare in the south where the climate was more moist.

Dr. A. B. RAPER showed photographs of a condition of dwarfism, in children in the onchocerciasis areas of East Africa, which had very characteristic features—muscular wasting, stunting of growth, kyphosis, and a characteristic facial profile. All the patients were heavily infected with onchocerciasis.

PATIENTS' PARLIAMENT

UNDER what he calls the "grandiloquent" title of "creative group therapy" Dr. George Day describes[1] efforts at self-help by the patients at a private sanatorium in Norfolk. Irritated by high prices in local shops, some of the patients opened one of their own; and, having no overheads, it prospered. Each corridor supplied a voluntary shopper—one of the ambulant patients—who ran errands for bedridden neighbours. One such volunteer from each corridor took a seat in the "Patients' Parliament", which met weekly and in the course of some ten years spent the shop's profits on books, games, records, broadcasting equipment, a television set, a film-projector, a gramophone, a typewriter, and such useful items as irons and hairdryers. Less to raise funds than to give everyone a feeling of participation, half-a-crown a month was levied on all patients who could conveniently afford it.

Early in its career the Parliament, which was not elected but self-perpetuating by cooption, began to hear and discuss patients' complaints and suggestions. Dr. Day acted as Speaker—literally, for he could speak but not vote. He had a veto on medical grounds, and at first put right proved complaints; later these tended to be solved by the patients. A new patient would find himself visited by ambulant ones as a routine—to see whether he wanted anything, not to gossip—and very quickly felt at home. Thus the spirits of self-help and of help-your-neighbour were fostered, and morale was high.

MEDICAL FILM

A NEW film, *Ergot—The Story of a Parasitic Fungus* (16 mm., sound, colour, 26 minutes, Britain 1958), traces briefly the discovery and therapeutic use of ergotamine and ergometrine.

The film opens with numerous references to ergot poisoning from the 16th century onwards. Half the film is then devoted to the life-cycle of the parasite and methods of growing it under controlled conditions for medicinal purposes. The symptoms of migraine are set out, and reference is made to a preparation of ergotamine tartrate including drugs to counter its side-effects. Prof. Chassar Moir describes the discovery of ergometrine in 1935; and finally a patient being delivered in the maternity department at University College Hospital, London, is seen to be given an intravenous injection of the drug.

This is a good film, particularly interesting in the sequences on the history of ergot poisoning and on the cultivation of the parasite. Douglas Fisher's colour photography is superb, and the commentary is informative.

Copies may be obtained free of charge from the Wellcome Film Library, 183, Euston Road, London, N.W.1.

University of Cambridge

On Dec. 21 the degree of B.Chir. was conferred on the following:

R. A. Aiken, G. M. D. Archer, A. M. Barnie-Adshead, D. G. Beynon, W. A. Brighouse, J. H. D. Briscoe, Andrew Brockman, Margaret Bulmer, I. E. Bush, A. J. Cameron, L. J. Chalstrey, Susan J. de Graaff-Hunter, A. J. Dell, R. C. Dobbie, P. M. E. Drury, Christopher Dulake, A. J. Dyer, Nigel Edwards, R. H. Ellis, R. A. Elson, N. J. B. Evans, P. W. Fisher, A. F. Fleming, David Freeman, C. S. Goodwin, N. J. C. Grant, P. C. Green, P. R. Greenfield, A. H. Henderson, N. E. S. Holden, H. C. Hollingworth, A. W. Jowett, B. S. Kennett, Susan A. Leaver, A. C. W. Lewis, A. D. MacAdam, Napier Malcolm, P. M. S. Margand, B. S. Mather, John Miller, J. G. Miller, A. B. J. Miller-Williams, E. W. R. Oakden, Miles Parkes, D. J. S. Pendlebury, Neil Powers, P. H. Rack, R. S. O. Rees, M. B. Rees-Jones, M. W. Riddall, D. J. Riley, Julian Rivers-Kirby, P. D. Rohde, G. I. Sinclair, David Tidmarsh, J. C. Twomey, Peter Weston, M. C. Woodhouse, F. C. Worlock.

University of St. Andrew

On Jan. 10 the following degrees were conferred:

M.D.—F. W. Wigzell.

Ph.D.—P. R. Roy.

M.B., Ch.B.—J. C. Anderson, Margaret M. Arrowsmith, Campbell Calder, Marie M. Deacon, S. A. Khaliq, A. M. C. Macgregor, G. J. Robertson, P. C. Robson, L. W. J. Ross, I. M. Stewart.

1. Day, G. *Perspect. Biol. Med.* 1957, **1**, 119.

University of London

On Dec. 11 the degree of PH.D in the faculty of medicine was conferred on J. G. Howard.

University of Liverpool

A symposium on the frontal lobes, organised by the department of studies in psychological medicine, will be held on Saturday, March 22.

The speakers will be Dr. Italo Calma, Dr. Hugh Jarvie, and Mr. Walpole Lewin. Further particulars may be had from Dr. Jarvie, 77, Bedford Street South, Liverpool, 7.

University of Glasgow

On Jan. 11 the following degrees were conferred:

M.D.—J. B. Brennan, R. W. Bryson, E. C. Easson, *Kenneth Fraser, A. W. Gardner, *I. S. MacDonald, R. L. Orchardson, *W. O. Thomson.
* With commendation.

Ph.D.—J. K. Burns.

M.B., Ch.B.—Nasiru-Deen Akilade, A. W. Baird, I. W. MacA. Baxter, J. S. Begg, W. D. S. Blaikie, J. S. Carlisle, Andrew Craig, T. W. Cross, P. J. Docherty, J. R. Donaldson, William Ducat, J. P. Duffy, R. L. Elder, Christina C. Hall, Philomena C. Hynes, R. G. S. Leask, J. R. Logan, A. W. Macara, J. R. L. McConnell, H. N. Macdonald, A. J. Mackintosh, I. C. D. Martin, A. C. Miller, I. R. Pendrigh, Susan M. Ritchie, C. A. Robertson, A. R. Sarbah-Yalley, C. J. Schwarz, Gwen J. Scott, J. D. Simpson, Samsoondur Sonah, L. G. Stewart, Margaret G. Wallace, A. F. Wright.

Royal Microscopical Society

Mr. John Bunyan, L.D.S., Leverhulme research fellow at St. Mary's Hospital Medical School, has been elected president of the society.

The Guild of Teachers of Backward Children

This guild will hold its second national conference at Goldsmith's College, London, on April 18 and 19. The hon. secretary of the guild is Mr. S. S. Segal, 10, Fielding House, Boundary Road, N.W.8.

Royal Commission on Remuneration

The Royal Commission on Doctors' and Dentists' Remuneration will hold a public hearing on Friday, Jan. 31, at Church House, Great Smith Street, London, S.W.1, at 11.15 a.m. Representatives of the Royal College of Physicians of London have been invited to attend.

Training Posts in Hospital Administration

Applications for a further 16 training posts for prospective hospital administrators are invited.

The posts are open both to young officers already employed in the National Health Service and to graduates and professionally qualified people who wish to make hospital administration their career. Further particulars may be had from the Ministry of Health, Savile Row, London, W.1.

College of General Practitioners

Butterworth gold medal.—The subject for this year's prize essay, by a member or associate of the college, is Second Opinions. Further particulars may be had from the chairman of the awards committee of the college, 41, Cadogan Gardens, Sloane Square, London, S.W.3. Essays must be submitted not later than Sept. 20.

Royal Air Force Appointments

Air Commodore G. A. M. Knight has been appointed deputy director-general of medical services in the Royal Air Force with the acting rank of air vice-marshal, in succession to Air Vice-Marshal L. M. Corbet who is retiring. Group-Captain J. F. Dales has been appointed principal medical officer, 2nd Allied Tactical Air Force, with the acting rank of air commodore.

Confederation of Health Service Employees

At a conference of the confederation held in London on Jan. 15 delegates rejected a proposal to impose a national ban on overtime for all members (*Times*, Jan. 16). Since September temporary bans on overtime have been imposed on mental hospitals in different parts of the country, and the results of these local bans were criticised at the meeting. Some speakers doubted whether a ban on overtime would now be an effective way of showing members' discontent. A delegate said that, owing to a change in conditions of the labour market, hospitals at Lincoln, and he believed elsewhere, now had more staff than at any time in the past six years.

World Health Organisation

The Republic of Czechoslovakia has resumed active participation in the work of the World Health Organisation. Czechoslovakia became a member State of W.H.O. in 1948, but in 1950 discontinued active participation. During 1957 Albania, Bulgaria, Poland, the U.S.S.R. and Rumania announced their resumption of active participation in W.H.O. Member States which still remain inactive are Hungary, Ukranian S.S.R., and Byelorussian S.S.R.

Executive Board.—The twenty-first session of the Board began in Geneva on Jan. 14, under the chairmanship of Sir John Charles. The chief item on the agenda is the examination of the Director-General's proposals for programme and budget for 1959. Emergency supplies of vaccine were approved for Ceylon, where floods have covered a third of the island's surface, 300,000 people are estimated to be homeless, and epidemics of typhoid and cholera are feared. Half a ton has already been sent, and another quarter of a ton will soon follow. Part of the cost will be reimbursed by Ceylon.

CORRIGENDA: *Phæochromocytoma of the Urinary Bladder.*—In the article by Dr. B. R. B. Lumb and Dr. G. A. Gresham (Jan. 11, p. 81) the year in the first line of the fourth paragraph of the case-report should have been given as 1956. In the fourth line of that paragraph and in the penultimate line of the sixth paragraph the noradrenaline level was in microgrammes. In fig. 2 the specimen was reproduced at less than actual size.

The Check-valve Mechanism and the Meaning of Emphysema.—In Dr. W. A. Lister's article (Jan. 11, p. 66) the illustration shown as fig. 2 was in fact fig. 1, and that shown as fig. 1 was fig. 2.

Diary of the Week

JAN. 26 TO FEB. 1

Monday, 27th

POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12
4 P.M. Dr. John Marshall: Observations on Spontaneous and Induced Paræsthesiæ in the Upper Limbs.
MANCHESTER MEDICAL SOCIETY (Medical School, University of Manchester)
9 P.M. *General Practice.* Dr. Aron Holzel: Allergies in Children.

Tuesday, 28th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Dr. D. H. M. Woolam: Experimental Approach to the Problem of Congenital Malformations. (Arris and Gale lecture.)
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Medicine.* Dr. William Sargant, Dr. Richard Asher, Prof. E. J. Wayne: Sedation and Stimulation of Man.
BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Dr. J. A. Fraser Roberts: Blood-Group Genetics.
ST. MARY'S HOSPITAL MEDICAL SCHOOL, W.2
5 P.M. Sir George Pickering: Hypertension in Pregnancy.
INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. G. C. Wells: Cutaneous Sarcoidosis.
ROYAL STATISTICAL SOCIETY
5.30 P.M. (Westminster Medical School, Horseferry Road, S.W.1.) Dr. D. D. Reid: Mortality of Miners.

Wednesday, 29th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Prof. Arnold Sorsby: Experimental Degeneration of the Retina.
POSTGRADUATE MEDICAL SCHOOL
2 P.M. Prof. L. J. Witts: Aspects of Iron Deficiency.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: Hamartomata.
INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. Ian Longmuir: Aspects of Tissue Respiration.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow
5 P.M. Sir Roy Cameron: Problem of Biliary Cirrhosis.

Thursday, 30th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. G. F. Murnaghan: The Mechanism of Congenital Hydronephrosis. (Hunterian lecture.)
BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Dr. Edith Bülbring: Physiology and Pharmacology of Intestinal Smooth Muscle.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. C. D. Calnan: Drug Allergy.
ROYAL STATISTICAL SOCIETY
7 P.M. (Leicester College of Technology, The Newarke, Leicester.) Dr. W. R. S. Doll: Smoking and Cancer of the Lung.
UNIVERSITY OF ST. ANDREWS, Queen's College, Dundee
5 P.M. Sir Roy Cameron: Chemical Mediation of Inflammation.

Friday, 31st

POSTGRADUATE MEDICAL SCHOOL
10 A.M. Mr. Cecil Flemming: Observations on Secondary Carcinoma in Bone.
4 P.M. Dr. K. W. Donald: Hæmodynamic Changes in Mitral Stenosis and the Findings after Operation.

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2 mg. Ergotamine Tartrate B.P. 100 mg. Caffeine B.P. 0.25 mg. total alkaloids of belladonna 100 mg. *iso*butylallyl barbituric acid	SUPPOSITORIES

* Standing on one's head is reputed to be a good cure for migraine[1]—but not every patient is so agile.

[1] *Brit. med. J.* (1957) 2, 633

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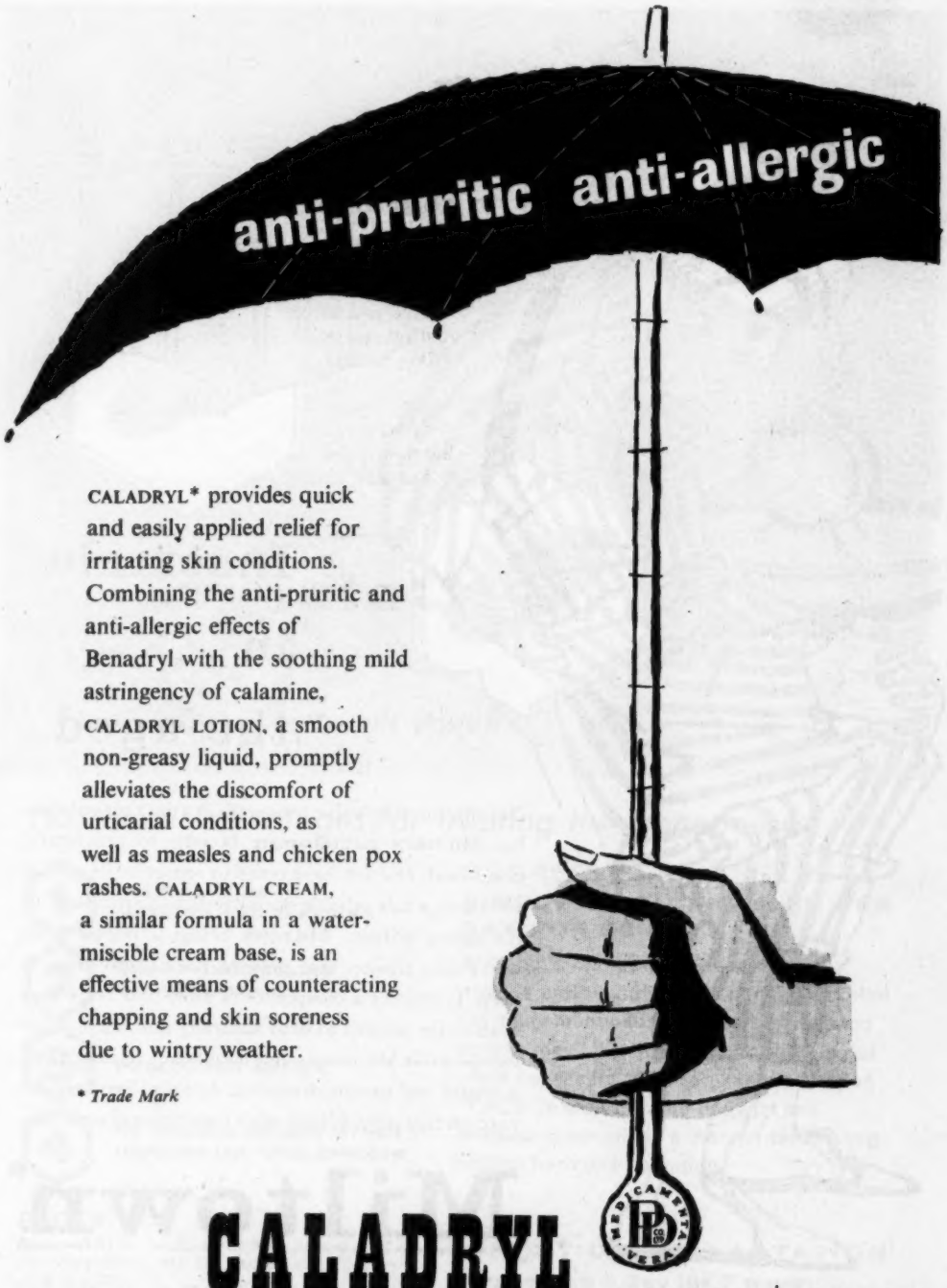

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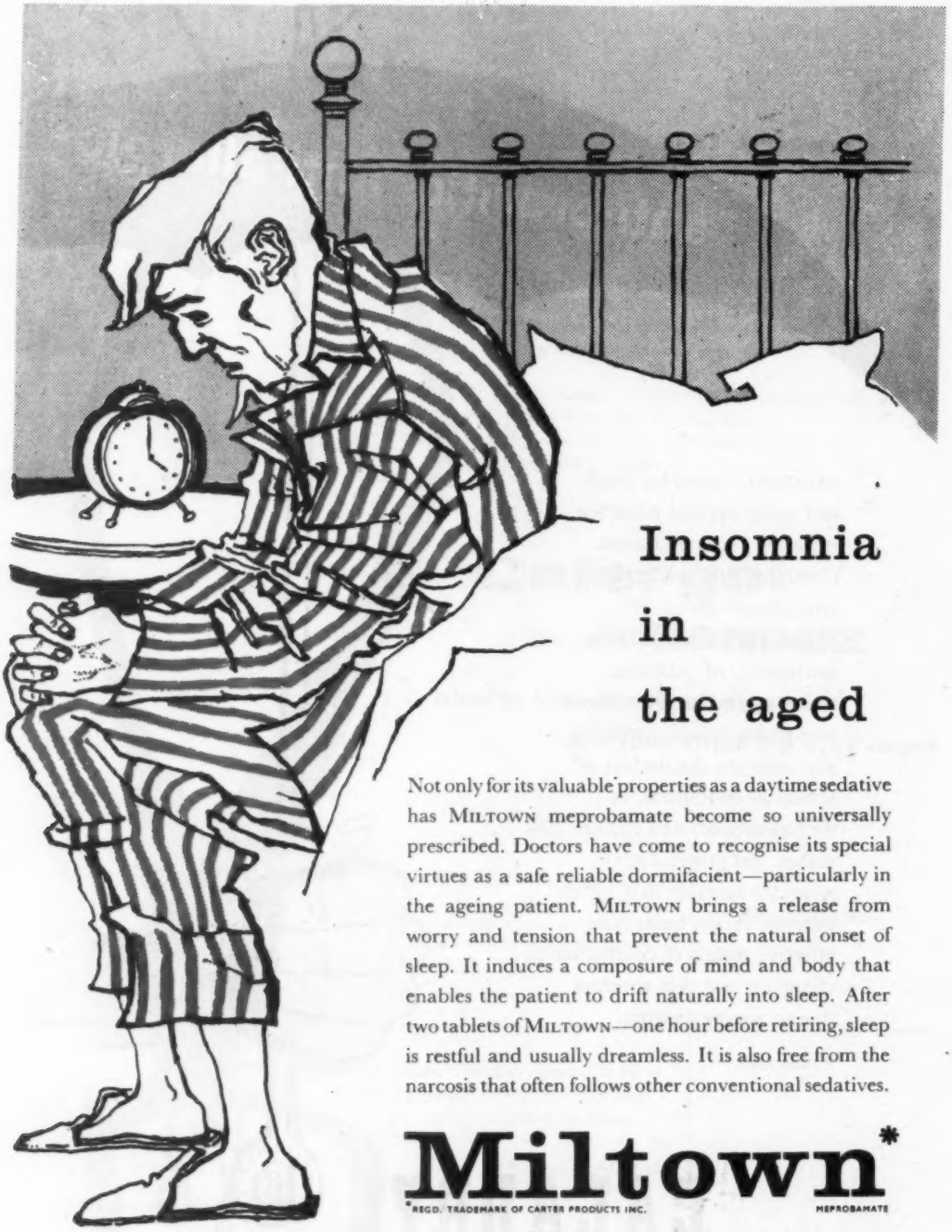

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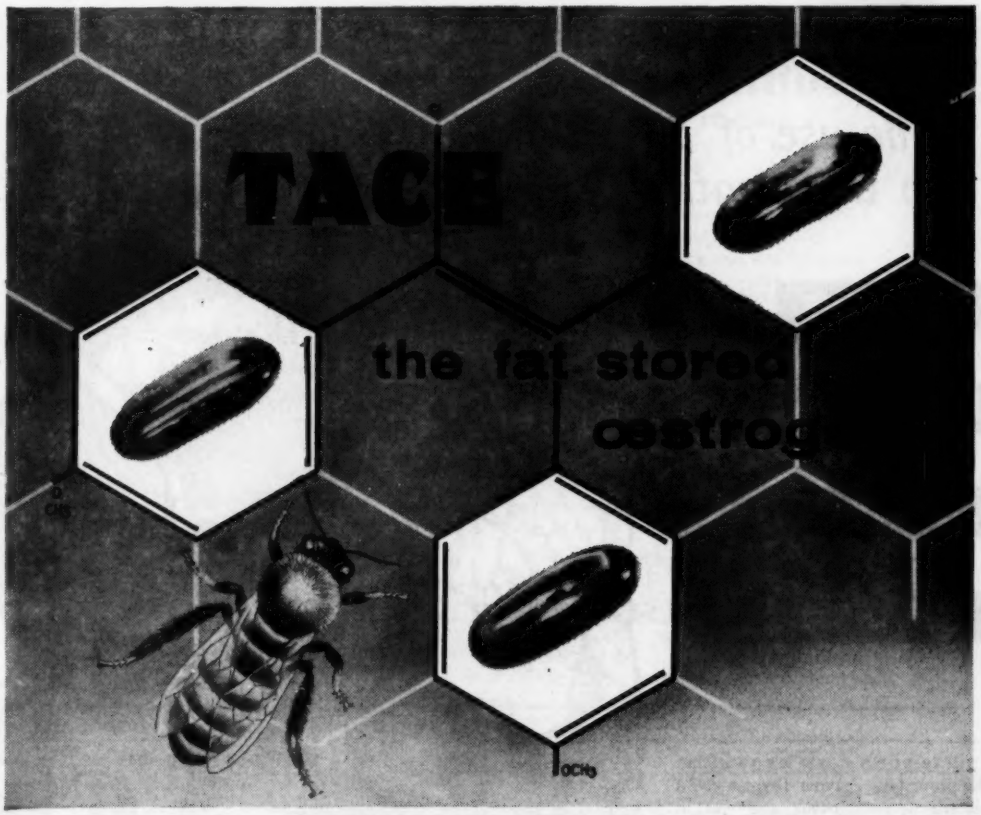

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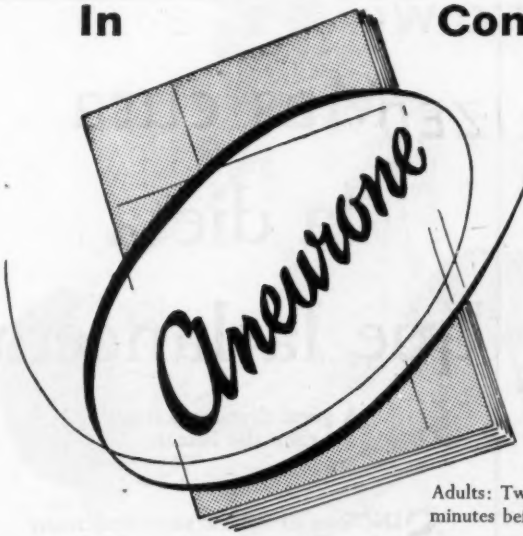

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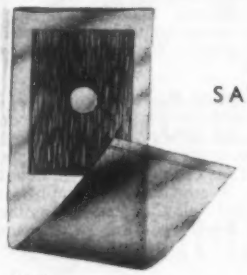

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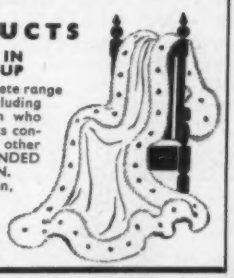

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JARMAN, RONALD (Fellow 1948).
BELAM, OSWALD HENRY (Fellow 1953).
BOYLE, ANDREW KERR (Fellow 1953).
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Applications to The Dean, 23, Queen-square, W.C.1.

INSTITUTE OF DERMATOLOGY
ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN
Lisle-street, Leicester-square, London, W.C.2

CONSULTANT DERMATOLOGISTS REFRESHER COURSE from 14TH–18TH APRIL, 1958.

Particulars from and applications to the Dean by 21st March.

PRIMARY F.F.A.R.C.S.
JUNE, 1958

A COURSE OF EVENING TUTORIALS IN ANATOMY, PHYSIOLOGY, AND PHARMACOLOGY will be held at Lambeth Hospital, S.E.11 (Elephant and Castle), from 10TH MARCH to 30TH MAY, 1958.

For details apply to Secretary, Department of Anæsthesia, Lambeth Hospital, S.E.11.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE
DEPARTMENT OF MEDICAL STATISTICS AND EPIDEMIOLOGY

A COURSE in the Application of Statistical Methods to Medicine and Epidemiology will be held in MARCH to JUNE, 1958 (upon TUESDAYS and THURSDAYS from TUESDAY, 4TH MARCH to TUESDAY, 24TH JUNE inclusive, from 10 A.M. to 3 P.M.). Students without a medical qualification can be accepted. Details of the syllabus of this course can be obtained on request. Fee for the course is 15 guineas.

Applications for admission must be made to the Registrar, The London School of Hygiene and Tropical Medicine, Keppel-street, W.C.1, before 15th February.

SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 7TH JULY, 1958. The following Examination will be held in DECEMBER, 1958.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

THE UNIVERSITY OF LIVERPOOL
FACULTY OF MEDICINE
DEPARTMENT OF ANÆSTHESIA

A COURSE OF POSTGRADUATE INSTRUCTION IN ANÆSTHESIA, limited to 12 students, will be conducted at the University of Liverpool lasting for 1 academic year and commencing 1ST OCTOBER, 1958. This course gives theoretical and practical instruction to students intending to sit for the Fellowship of the Faculty of Anæsthetists. For the purpose of gaining practical experience, the students will be found suitable appointments in recognised General Hospitals within the Liverpool area.

The fee for the course is £75.

Application forms may be obtained from the Reader in Anæsthesia, The University of Liverpool, Liverpool, 3, and should be returned not later than 1st March, 1958.

UNIVERSITY OF MANCHESTER

DIPLOMA IN BACTERIOLOGY

The COURSE for the Diploma in Bacteriology requires full-time attendance in the Department of Bacteriology for 1 academic year (October–June). It is suitable for those who have qualified in medicine, veterinary medicine or other branches of science related to bacteriology. The course includes general and systematic bacteriology, bacterial chemistry, serology, immunology, virology, mycology and statistics.

All candidates must present evidence of previous training approved by Senate as satisfactory for admission to the course and register as postgraduate students of the University.

Further particulars and forms of application may be obtained from the Secretary, Department of Bacteriology, York-place, Manchester, 13.

GLASGOW POST-GRADUATE MEDICAL EDUCATION COMMITTEE

REFRESHER COURSE FOR GENERAL PRACTITIONERS

A REFRESHER COURSE will be held from 19TH to 31ST MAY, 1958. The greater part of the Course will comprise clinical demonstrations, ward visits, and lectures in General Medicine, General Surgery, and Obstetrics, but sessions on Infectious Diseases, Child Health, Dermatology, Ophthalmology, &c., will also be included. The fee for practitioners ineligible for Government grant is 10 guineas.

CHEMOTHERAPY

A short 2-day COURSE on the principles and application of Chemotherapy in acute and chronic infections will be held at Ruchill Hospital, Glasgow, on 22ND and 23RD MARCH, 1958. On each day, instruction will be given from 9 A.M. to 5 P.M. and will consist of lectures, clinical demonstrations, seminar discussions and demonstrations of laboratory practice. The fee for practitioners ineligible for Government grant is 2 guineas.

Admission to either of the above Courses is limited and early application should be made to the Director of Post-Graduate Medical Education, The University, Glasgow, W.2.

CLINICAL ATTACHMENTS

The Committee is prepared to consider applications for post-graduate instruction from graduates studying for higher diploma. An accepted applicant will be attached to an appropriate unit in a Glasgow teaching hospital for any period up to 3 months, where he will obtain intensive clinical experience by sharing in the day-to-day routine of diagnosis and treatment. The fee is £5 per month.

Applicants should write to the Director of Post-Graduate Medical Education, The University, Glasgow, W.2, stating age, qualifications and professional experience, and enclosing 2 testimonials from Senior Clinicians with whom they have recently been associated.

SHEFFIELD REGIONAL HOSPITAL BOARD

RESEARCH PRIZES

The Board announce that, following consideration of the entries received for their Research Prize competition closing on the 1ST OCTOBER, 1957, they have awarded prizes of £50 each to the following :—

Mr. D. A. C. REID, Senior Registrar in Hand Surgery, Derbyshire Royal Infirmary and Harlow Wood Orthopædic Hospital, for his entry entitled "Thumb reconstruction".

Dr. A. A. EARN, formerly Registrar in Obstetrics and Gynæcology, Leicester General Hospital, for his entry entitled "Living births, following antimicrobial therapy for infertility associated with proven genital tuberculosis".

L. W. FAULKNER, Secretary to the Board.

Sheffield, 13th January, 1958.

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL. Applications are invited for the post of SENIOR LECTURER in the Department of Bacteriology. The initial salary will depend on the age and previous experience of the applicant, but will be between £1650 and £1950, with participation in the F.S.S.U. scheme.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be sent as soon as possible to Professor RONALD HARE, from whom further details of the appointment may be obtained.

UNIVERSITY OF LONDON. Applications are invited for IMPERIAL CHEMICAL INDUSTRIES RESEARCH FELLOWSHIPS in Biochemistry, Chemistry, Chemotherapy, Engineering, Metallurgy, Pharmacology, Physics. The Fellowships will be within the range of £800–£1000 p.a. and will normally be tenable from 1ST OCTOBER, 1958, for 3 years. Family allowances and F.S.S.U.

Detailed regulations and application forms may be obtained from the Academic Registrar, University of London, Senate House, W.C.1. Applications must be received not later than 30th April, 1958.

UNIVERSITY OF LONDON. Applications are invited for a TURNER AND NEWALL RESEARCH FELLOWSHIP in Engineering, Inorganic Chemistry, or Physics. The Fellowship will be within the range of £800–£1000 p.a. and will normally be tenable from 1ST OCTOBER, 1958, for 3 years. Family allowances and F.S.S.U.

Detailed regulations and application forms may be obtained from the Academic Registrar, University of London, Senate House, W.C.1. Applications must be received not later than 30th April, 1958.

UNIVERSITY OF LOUISVILLE, Kentucky, U.S.A. DEPARTMENT OF PEDIATRICS. Applications are invited from British medically qualified physicians, Male or Female, for :—

(*a*) A TEACHING FELLOW;
(*b*) Up to 2 HOUSE OFFICERS to the resident staff (of which there are 20).

Both positions are for 1 to 2 years with original contract renewable after 1 year.

Applicants for the Teaching Fellow must have completed at least 1 year of general, and 2 years of pediatric house appointments (Registrar grade desirable). Salary available dependent upon experience. Resident staff applicants should have completed 1 year general House Officer appointments. Annual stipend is $1000, 1st-year resident; $1890, 2nd-year resident—both with usual emoluments. An applicant with experience in pædiatrics might be appointed as a 2nd-year resident initially. Preference given to unmarried applicants planning to return home after the appointment. Transportation would be at the expense of the individual, but the possible support of the Fulbright Traveling Fund should be explored.

A member of the Department will be in London during the week of 24th–29th February for interview of candidates shortlisted. Applicants should first apply with curriculum vitæ to the Department, ALEX J. STEIGMAN, Professor, University of Louisville Medical School, Louisville, Kentucky, U.S.A.

THE UNIVERSITY OF LIVERPOOL. Applications are invited for the post of LECTURER or SENIOR LECTURER in the Department of Tropical Hygiene in the School of Tropical Medicine, at an initial salary within the range £1200–£2000 p.a. for a Lecturer and £1800–£2000 p.a. for a Senior Lecturer, according to qualifications and experience.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 31st March, 1958, by the Registrar, from whom further particulars of the conditions of appointment may be obtained.

Hospital Services: Senior Appointments

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

Part-time CONSULTANT NEUROLOGIST to Tottenham Group of hospitals for 2 sessions a week. Main duties initially at Prince of Wales's General Hospital, N.15.

Part-time CONSULTANT ANÆSTHETIST to Brentwood District Hospital, Brentwood, Essex, for 3 sessions a week (fixed sessions : Wednesday afternoon, Thursday morning and alternate Saturday mornings).

Full-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Warley Hospital, Brentwood, Essex. House available.

Applications (6 copies), and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday 22nd February.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

1. CONSULTANT ANÆSTHETIST, whole-time or maximum sessions, Edgware General Hospital, Edgware, Middlesex (638 Beds). Duties will include emergencies at Bushey Maternity Hospital (50 obstetric beds).

Applications before 24th February, 1958.

2. CONSULTANT ORTHOPÆDIC SURGEON, 2 half-days a week, St. Charles' Hospital, Ladbroke-grove, W.10 (575 Beds).

Applications before 26th February, 1958.

3. CONSULTANT PLASTIC SURGEON, 7 half-days a week, St. Charles' Hospital, Ladbroke-grove, W.10 (575 Beds).

Applications before 3rd March, 1958.

4. CONSULTANT RADIOLOGIST, 2 half-days a week, West End Hospital for Neurology and Neurosurgery, Dean-street, W.1 (35 Beds). Candidates should have experience in neuroradiology.

Applications before 5th March, 1958.

Hospitals may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the post of Part-time CONSULTANT ORTHOPÆDIC SURGEON AND ASSISTANT CLINICAL DIRECTOR (8–9 sessions), duties to commence as soon as possible after 12th April, 1958.

Applications, stating nationality, date of birth, qualifications, dates and details of present and previous appointments, together with names of 3 referees, to be addressed to the House Governor not later than 26th February.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of Part-time CONSULTANT ORTHOPÆDIC SURGEON with special responsibility for hand surgery (2 sessions), duties to commence as soon as possible after 12th April, 1958.

Applications, stating nationality, date of birth, qualifications, dates and details of present and previous appointments, together with names of 3 referees, to be addressed to the House Governor not later than 26th February.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in E.N.T. Surgery to fill a vacancy in the approved trainee establishment in the Woolwich Group of hospitals. The post will be vacant from 1st April, 1958. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 8th February, 1958.

ST. THOMAS'S HOSPITAL, London, S.E.1. Physician to the Pædiatric Department. Consultant status, with membership of the Medical Committee. 4 sessions per week. Vacant 13th October, 1958.

Applications (12 copies), naming 3 referees, to Clerk of the Governors by 14th February, 1958.

ST. THOMAS'S HOSPITAL, London, S.E.1. Anæsthetist. Consultant status, with membership of the Medical Committee. 6 sessions per week. Vacant 12th November, 1958.

Applications (12 copies), naming 3 referees, to Clerk of the Governors by 14th February, 1958.

BRISTOL MENTAL HOSPITALS. South-Western REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a Whole-time CONSULTANT PSYCHIATRIST to the Bristol Clinical Area. The successful candidate will work mainly at the Bristol Mental Hospital, Fishponds, but may be required to visit other hospitals in the clinical area as determined by the Regional Board from time to time. No house is available but there may be a small flat at Fishponds Hospital.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 15th February, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT SURGEON, Dudley Road Hospital, Birmingham. Higher qualification and wide surgical experience essential.

Applications (15 copies), stating age, qualifications, nationality, present and previous appointments, and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 25th February, 1958.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of Locum CONSULTANT RADIODIAGNOSTICIAN based on Essex County Hospital, Colchester, for the period 28th June–17th August, 1958.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ASSISTANT PHYSICIAN in Geriatrics (whole-time), Norfolk and Norwich area. Main hospital is West Norwich Hospital, where the Geriatric Department is the pivotal point of the area service under the Consultant Physician in Geriatrics. Higher qualification, good experience in general medicine necessary and experience in geriatrics desirable. Salary scale £1653 15s.–£2126 5s.

Applications (8 copies), stating age, experience and the names of 3 referees, to the Secretary of the Board, 117, Chesterton-road, Cambridge, by 10th February, 1958. Candidates are invited to visit hospitals concerned by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

HASTINGS HOSPITAL MANAGEMENT COMMITTEE. Locum CONSULTANT ANÆSTHETIST required for 9 sessions weekly as from 17th February, 1958, for a period of not less than 7 weeks.

Apply in writing to the Group Secretary, 11, Holmesdale-gardens, Hastings, together with copies of current testimonials or names of 2 referees, by not later than 31st January, 1958.

NEWCASTLE REGIONAL HOSPITAL BOARD. ASSISTANT OPHTHALMOLOGIST (Senior Hospital Medical Officer), whole-time, or maximum part-time for 9 notional half-days per week, for Sunderland and Hartlepools Groups of hospitals—main hospitals Sunderland Eye Infirmary (60 Beds), Sunderland Royal Infirmary (300 Beds), Sunderland General Hospital (444 Beds), General Hospital, West Hartlepool (468 Beds), Hartlepools Hospital (112 Beds). Population served : Sunderland 362,630, Hartlepools 132,110. Further particulars from Senior Ophthalmic Surgeon, Clinic No. 1, Sunderland Eye Infirmary, Sunderland.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. ASSISTANT VENEREOLOGIST (Senior Hospital Medical Officer), whole-time or maximum part-time for Newcastle upon Tyne Group of hospitals and associated clinics in district—main hospital Newcastle General (800 Beds).

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, within 28 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time appointment of RESIDENT ASSISTANT PHYSICIAN (graded for the purposes of salary as Senior Casualty Officer), tenable at the Royal Victoria Infirmary. The appointment is for 1 year in the first instance and may be renewed to a maximum of 4 years. The successful candidate may have clinical responsibilities on one of the medical wards and will be responsible for the day-to-day supervision of the Casualty and Admissions Department. The appointment will be subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Part-time CONSULTANT GENERAL SURGEON for 9 notional half-days a week in the South-East Kent Group of hospitals. The successful candidate will be required to reside in the area. Candidates must have had a wide experience in general surgery and be Fellows of a Royal College of Surgeons. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales). Candidates may visit the hospitals concerned.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 8th February, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as CONSULTANT in Pathology (whole-time or 9 notional half-day sessions weekly) to the Isle of Thanet Group of hospitals. The successful candidate may be associated for relief duties with the laboratory at the Kent and Canterbury Hospital (Canterbury Group) but the major portion of the work will be in the Isle of Thanet Group. Candidates must have had a wide experience in pathology, with a special interest in chemical pathology and/or bacteriology, and a higher university degree or membership of a Royal College of Physicians is desirable. Applicants may visit the area.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 8th February, 1958.

LEEDS REGIONAL HOSPITAL BOARD

CONSULTANT in Anæsthetics (maximum part-time sessions). Hospitals in the East Riding of Yorkshire—mainly at Westwood Hospital, Beverley. 1 session at Hull Royal Infirmary. Person appointed to reside in Beverley.

Whole-time ASSISTANT GERIATRICIAN (Senior Hospital Medical Officer scale) for duties at hospitals in the Leeds A and B Groups (933 Beds). The successful candidate will work under the Consultant Geriatrician, and will be required to reside in or near Leeds. There is an organised Area Geriatric Service in existence. The post offers good experience to candidates of Senior Registrar (or equivalent status) in general medicine who may decide to specialise in geriatrics, and there are excellent opportunities for gaining experience in rehabilitation and physical medicine.

Whole-time or Part-time ASSISTANT OPHTHALMOLOGISTS (Senior Hospital Medical Officer scale) for duties at the Royal Eye and Ear Hospital, Bradford (3 sessions), and School Clinics at Bradford and the adjacent West Riding Areas (3 sessions), and Dewsbury (1 session). The Board is prepared to consider applications from suitably qualified and experienced practitioners either for whole-time or for part-time employment. Applicants for part-time work should state the maximum number of sessions which they can undertake.

Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer scale), Broadgate Hospital, Beverley, and associated clinics at Beverley, Driffield and Hull. Married accommodation may be available. Candidates should normally hold a D.P.M. but applications will also be considered from candidates without previous experience in psychiatry who hold a higher medical qualification, have had wide experience in general medicine in the Senior Registrar grade and intend to obtain a D.P.M. and specialise in psychiatry.

Applications (12 copies), stating age, qualifications and details of present and previous appointments with dates, and names and addresses of 3 referees, to The Secretary, Park-parade, Harrogate, by 11th February, 1958.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of whole or maximum part-time CONSULTANT PHYSICIAN for duty with the Regional Geriatric Service.

Applications, together with the names of 2 referees, should be forwarded by 20th February, 1958, to the Senior Administrative Medical Officer, 1, Albyn-place, Aberdeen, from whom further particulars and a form of application may be obtained.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time or maximum Part-time CONSULTANT RADIOLOGIST required for the Rotherham Group of hospitals.

Application forms and further details from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 24th February, 1958.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time or maximum Part-time CONSULTANT RADIOLOGIST required. Duties mainly in hospitals in the Mansfield area.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 24th February, 1958.

SHEFFIELD REGIONAL HOSPITAL BOARD. Maximum Part-time CONSULTANT ANÆSTHETIST required for the City General Hospital and Wharncliffe Hospital, Sheffield.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 17th February, 1958.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the appointment of Whole-time ASSISTANT CHEMICAL PATHOLOGIST (salary in accordance with Senior Hospital Medical Officer scale) in the above Teaching Hospitals. Experience of general pathology and of chemistry is essential; a higher medical qualification is desirable, as is a scientific qualification.

Applications, with the names of 3 referees, to be sent to the Chief Administrative Officer, United Sheffield Hospitals, Weststreet, Sheffield, 1, not later than 8th February, 1958, from whom further details may be obtained.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT RADIOLOGIST required Cardiff Hospital Management Committee area immediately for approximately 2 months.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Whole-time SENIOR CASUALTY OFFICER required at Caerphilly District Miners' Hospital, in the Rhymney and Sirhowy Valleys Hospital Management Committee area. Commodious family flat at reasonable rent. Salary within range of £1653 15s.–£2126 5s. Tenure of appointment for a period not exceeding 4 years.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

Hospital Services: Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications invited for the post of NON-RESIDENT HOUSE PHYSICIAN for which there are 3 vacancies, for 6 months from 1st April, 1958. Duties include work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

Applications, stating age, qualifications with dates, nationality and appointments held, together with copies of testimonials, by 8th February, 1958, to KENNETH A. F. MILES, House Governor.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in General Medical and Cardiological Department. Post vacant 23rd March, 1958. Pre-registration candidates only will be considered.

Applications, with 2 testimonials, to Medical Director by 1st February, 1958.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST, graded Senior House Officer. Post vacant 16th February, 1958. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c. Recognised for D.A. and F.F.A. R.C.S.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of HOUSE SURGEON to Gynæcological Department (recognised for M.R.C.O.G.). Duties to commence 1st March, 1958. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 28th January, 1958.

FOREST GATE HOSPITAL, Forest-lane, E.7. Pre-registration OBSTETRIC HOUSE OFFICER (second post) required for 6 months commencing 1st March, 1958. The appointment is recognised for training candidates for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications, with names of 2 referees, to Hospital Secretary by 1st February, 1958.

GERMAN HOSPITAL, London, E.9. (General—157 Beds.) Applications for the 6 months' resident appointment, vacant 19th February, of registered HOUSE SURGEON (obstetrics and gynæcology) should be sent to the Group Secretary, Hackney Hospital, E.9, by 3rd February, quoting GH/HSO.

GROUP LABORATORY, Mile End Hospital, Bancroft-road, London, E.1. Locum REGISTRAR in Pathology required to commence duty on 15th February, 1958.

Applications, stating age, qualifications and experience, to be sent to the Secretary, Stepney Group Hospital Management Committee, Mile End Hospital, Bancroft-road, E.1, not later than 5th February, 1958.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-month resident appointment, now vacant, of CASUALTY OFFICER AND HOUSE SURGEON (E.N.T.) (registered House Officer grade) should be sent to Secretary, above address, quoting HH/CHO.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-month resident post, vacant end of February, of Pre-registration HOUSE PHYSICIAN should reach Secretary, above address, by 3rd February, quoting HH/PHP.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY AND SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Joint appointment. Whole-time REGISTRAR (obstetrics and gynæcology) required 1st April. Appointment tenable for 2 years, the first 6 months at Hammersmith Hospital and Institute of Obstetrics and Gynæcology, the next year at the Brighton and Lewes Group of hospitals, returning to Hammersmith Hospital for the final 6 months.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, The Board of Governors of the Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, by 1st February, 1958.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. Applications invited for the following resident posts ; all recognised for M.R.C.O.G.

2 HOUSE SURGEONS (obstetrics). Posts vacant 1st April and 1st May.

1 HOUSE SURGEON (gynæcology). Post vacant 18th May.

Applications, stating age, qualifications, experience, names 2 referees, to Secretary, Board of Governors, The Hammersmith, West London, and St. Mark's Hospitals, Ducane-road, London, W.12, by 8th February.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Joint appointment with the North West Metropolitan Regional Hospital Board. Whole-time REGISTRAR (orthopædic) required. Post vacant now. Appointment tenable firstly at Heatherwood Hospital, Ascot (resident if required), studying long-term orthopædic surgery, transferring to Hammersmith Hospital and the Postgraduate Medical School (non-resident) on 1st August, 1958, studying orthopædic and traumatic surgery.

Applications, stating age, qualifications, experience, names 2 referees, to Secretary, Board of Governors, The Hammersmith, West London, and St. Mark's Hospitals, Ducane-road, London, W.12, by 1st February.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. SENIOR HOUSE OFFICER (Casualty Department), vacant 24th February. Recognised for F.R.C.S. 6 months' resident appointment and may then be renewed. Salary £819 10s. p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MILE END HOSPITAL, Bancroft-road, London, E.1. (484 Beds.) HOUSE SURGEON (pre- or post-registration). Post vacant 22nd February, 1958.

Application forms, obtainable from Physician-Superintendent, to be returned by 7th February, 1958, with copies of not more than 3 testimonials.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of a SENIOR REGISTRAR (whole-time) for work in the Academic Unit in Clinical Neurology. The appointment will be for 1 year in the first instance.

Applications, giving the names of 3 referees, to be sent to the undersigned not later than 1st February, 1958.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

MOTHERS' HOSPITAL (Salvation Army), London, E.5. (Maternity—110 Beds.) Applications for the 6 months' resident appointment, vacant 1st March, of pre-registration OBSTETRIC HOUSE SURGEON (post recognised for M.R.C.O.G.) should be sent to Group Secretary, Hackney Hospital, E.9, by 3rd February, quoting MH/HS.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. HOUSE SURGEON (resident), approved for pre-registration service. Post vacant 15th February.

Applications, stating age, qualifications, &c., and the names and addresses of 2 referees, to the Secretary at the above address.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

SURGICAL REGISTRAR (resident—single accommodation), East Ham Memorial Hospital, E.7. Recognised for F.R.C.S.

SURGICAL REGISTRAR (resident or non-resident), Wanstead Hospital, E.11. Recognised for F.R.C.S.

REGISTRAR in Orthopædic and Traumatic Surgery (resident), Harold Wood Hospital, Harold Wood, Essex. Recognised for F.R.C.S. Duties include general supervision of casualty department.

ORTHOPÆDIC REGISTRAR (non-resident), West Ham Group of hospitals; duties at Queen Mary's Hospital for the East End and East Ham Memorial Hospital.

ORTHOPÆDIC REGISTRAR (resident or non-resident), St. Andrew's Hospital, Billericay, Essex. Recognised for F.R.C.S.

CASUALTY REGISTRAR (non-resident—flat available), Chase Farm Hospital, Enfield. Occasional night and weekend duty.

MEDICAL REGISTRAR (resident or non-resident), St. Clement's Hospital, E.3.

PSYCHIATRIC REGISTRAR (resident—single accommodation—or non-resident), Claybury Hospital, Woodford Green, Essex. Recognised for D.P.M. 2200 Beds (annual admissions 1400). All forms of modern treatment. Weekly clinical conferences and seminars for D.P.M. Facilities to attend D.P.M. classes in London. Duties include attendance at outpatient clinics at general hospitals.

REGISTRAR in Obstetrics and Gynæcology (resident in hospital or in single or married furnished or unfurnished accommodation), General Hospital, Rochford, Essex. Some duties at Southend General Hospital.

Appointments subject to review after 1 year.

Application forms from Secretary, 11A, Portland-place, W.1, to be returned by 8th February.

NORTH MIDDLESEX HOSPITAL AND EDMONTON CHEST CLINIC, London, N.18. Applications are invited for the post of SENIOR HOUSE OFFICER (tuberculosis), resident, for 1st March. Appointment for 6 months in the first instance with possible extension to 1 year. Duties at above Hospital and Clinic under direction of the Chest Physician. Further details on request.

Applications, stating age, qualifications, experience, with copies of recent testimonials and/or names of 2 referees, to Hospital Secretary, by 30th January.

NORTH MIDDLESEX HOSPITAL, London, N.18. 2 RESIDENT HOUSE PHYSICIANS required, for 1st March, for 6 months. General medicine. Approved pre-registration posts (first or second).

Applications (in own handwriting), stating age, nationality, qualifications, experience, with copies of recent testimonials, to Hospital Secretary, by 29th January.

REGIONAL NEUROSURGICAL CENTRE (66 Beds), BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (neurosurgery). Vacant early February. Post recognised for F.R.C.S. and D.P.M. and provides excellent opportunity for training in neurology.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of RESIDENT MEDICAL OFFICER to work at the Liverpool Road Branch of the Royal Free Hospital. Terms and conditions of service in accordance with the Junior Hospital Medical Officer scale. Duties, which are for 6 months in the first instance, to commence on 1st April, 1958.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 31st January, 1958.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of SENIOR ORTHOPÆDIC REGISTRAR (full-time), non-resident, duties to commence as soon as possible. Applicants must be Fellows of one of the Royal Colleges of Surgeons. During the tenure of office 1 year may be spent at the Luton and Dunstable Hospital and 6 months at The Hospital for Sick Children, Great Ormond-street. In the event of a Registrar of the Royal National Orthopædic Hospital being appointed to the above vacancy, there will be a vacancy for the post of Registrar and applicants may, therefore, apply for either post.

Applications to be received not later than 21st February. Forms of application can be obtained from the House Governor, 234, Great Portland-street, London, W.1.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. (279 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY REGISTRAR required at above Hospital. Experience in practical operative surgery an advantage. Recognised post for F.R.C.S. Candidates may visit the hospital by direct appointment.

Application forms obtainable from and returnable to the Secretary, Royal Northern Hospital, N.7, by 4th February, 1958.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Women medical practitioners for the post of HOUSE PHYSICIAN. Vacant 1st March, 1958, for a period of 6 months.

Forms of application from the Secretary.

SOUTH EAST REGIONAL THORACIC SURGERY UNIT (50 Beds), BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER. Vacant mid-February. Recognised for F.R.C.S. 6 months' appointment and may then be renewed for a further period. The Unit treats all types of chest diseases and offers opportunity for comprehensive training in thoracic surgery.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. ANDREW'S HOSPITAL, Devons-road, Bow, E.3. HOUSE SURGEONS (2). Recognised pre-registration appointments.

Applications, with copy of at least 1 testimonial, should be sent to Hospital Secretary immediately.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (576 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædics, ophthalmology, plastics, E.N.T., &c.).

Applications, stating age, qualifications, experience, &c., together with names and addresses of 2 referees, to Hospital Secretary, immediately.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (576 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics), resident. Vacant 1st March, 1958. Post recognised for F.F.A. R.C.S. and D.A. Experience includes general thoracic and plastic anæsthetic work.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, to Hospital Secretary by 4th February, 1958.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited from suitably qualified Male candidates for the post of Whole-time REGISTRAR in the Venereal Diseases Department. The appointment, which is eminently suitable for persons reading for a higher qualification, is for a first period of 12 months as from 1st March, 1958, the holder being eligible for re-election.

Applications, stating nationality, date of birth, qualifications, details of experience, together with dates and National Health Service gradings of previous and present appointments and name and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 3rd February, 1958.

ST. MARY'S HOSPITAL, Paddington, W.2. Outpatient SURGICAL ASSISTANT (part-time, graded Senior House Officer) required for 3 notional half-days per week. The appointment, which is for a first period of 12 months, is designed for men or women who have already passed their Primary F.R.C.S., and is ideally suited for those reading for the Final, as a large number of clinical cases are available. The successful candidate will be required to take up duties as soon as possible.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 3rd February, 1958.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House SURGEON. Vacant January. Recognised for F.R.C.S. and approved for pre-registration service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. RESIDENT SURGICAL OFFICER (Senior Registrar grade) required for St. Peter's Hospital on 1st April, 1958. Applications invited from Male candidates on the British Register who have completed their training in general surgery. Appointment for 6 months, with opportunity for a further 6 months if recommended. Candidate should be prepared to spend 1 year at the hospital if required.

Applications (12 copies), and the names of 3 referees, should reach the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2, by 1st February, 1958.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of SENIOR REGISTRAR in the Radiotherapy Department for a period of 1 year in the first instance from a date to be arranged.

Applications, with names of 2 referees, to T. F. W. MACKEOWN, Administrator and Secretary, by 8th February, 1958.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) HOUSE SURGEON required. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WHITTINGTON HOSPITAL, London, N.19. Surgical REGISTRAR required for unit of 74 Beds consisting of general surgical beds with large gastro-enterological section. F.R.C.S. essential. Vacant March, 1958. Hospital may be visited by appointment with the Medical Superintendent (ARC. 3070, Extension 440).

Application forms obtainable from and returnable to Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, by 3rd February, 1958.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (pædiatrics) required at Ashton-under-Lyne General Hospital. Modern pædiatric unit, good neonatal and premature baby experience. Recognised for D.C.H. Vacant mid-March, 1958.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE HOSPITAL. (619 Beds.) HOUSE PHYSICIAN for the Pædiatric Department (18 medical beds). The post qualifies for D.C.H. Additional duties in Infectious Diseases Unit, Plastic Unit and Outpatient Department, Royal Buckinghamshire Hospital. Recognised pre-registration post, applications from registered practitioners will be considered. Post vacant 17th February, 1958. Interview 5th February, 1958.

Applications, with copies of 2 testimonials, to the Administrative Officer. Closing date 29th January.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the appointment of REGISTRAR in the Department of Radiology at the Aberdeen Royal Infirmary. The post is a whole-time one and is non-resident. Salary and conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, with the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ABERDEEN SPECIAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for 2 posts as SENIOR HOUSE OFFICERS (pædiatrics) in the Pædiatric Unit.

1. The duties of the first post will be undertaken mainly in Aberdeen Maternity Hospital.
2. The duties of the second post will be undertaken mainly in Aberdeen City Hospital.

Both appointments are tenable for a period of 12 months and applicants should indicate whether they wish to be considered for 1 or both appointments.

Applications, giving details of age, qualifications, experience, and the names of 2 referees, should be sent as soon as possible to the Group Medical Superintendent, Royal Aberdeen Hospital for Sick Children, Westburn-drive, Aberdeen.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE PHYSICIAN (pre-registration) required in March.

Applications, naming 2 referees, to Group Secretary, 19, Alexandra-road, Barnstaple, N. Devon.

BARROW-IN-FURNESS. NORTH LONSDALE HOSPITAL. Applications are invited for the resident post of HOUSE OFFICER (surgical) (recognised for pre-registration) at the North Lonsdale Hospital, Barrow-in-Furness. Post available immediately. Recognised for F.R.C.S.

Applications to the Group Secretary, Barrow and Furness Hospital Management Committee, 105, Abbey-road, Barrow-in-Furness.

BARROW-IN-FURNESS. RISEDALE MATERNITY HOSPITAL. BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Obstetric and Gynæcology Department. Applications are invited for the resident post of SENIOR HOUSE OFFICER at the above Hospital. Post available middle March, 1958. Hospital approved for D.Obst.R.C.O.G.

Applications to the Group Secretary, 105, Abbey-road, Barrow-in-Furness.

BEDFORD GENERAL HOSPITAL. (436 Beds.) House SURGEON post vacant immediately. Pre- or post-registration, recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute surgical units.

Applications, with copies of testimonials, to be sent immediately to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.) ORTHOPÆDIC HOUSE SURGEON (first, second or third post), vacant now. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully registered practitioners may apply. Recognised for F.R.C.S.

Apply Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) Locum ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer grading according to experience).

Applications to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required for Area Laboratory. Offers experience in all branches of pathology.

Detailed applications to Group Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Stoke-on-Trent Group, Princes-road, Stoke-on-Trent.**

REGISTRAR (medical—chest diseases). Duties alternating between Cheshire Joint Sanatorium, City General Hospital and Stoke-on-Trent Chest Clinic. Post offers wide experience in the investigation and medical and surgical treatment of tuberculosis and other chest diseases. Resident or non-resident. Possibility of married accommodation becoming available later.

(2) **West Bromwich Group, Edward-street, West Bromwich.**

REGISTRAR (general medicine), West Bromwich General Hospital (144 Beds). Resident. Married quarters available. Higher qualifications an advantage.

(3) **Shrewsbury Group, Royal Salop Infirmary, Shrewsbury.**

REGISTRAR (radiology—radiodiagnosis), Shrewsbury Group and Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry. Resident or non-resident.

Application forms from Group Secretaries, to be returned by 3rd February, 1958.

BIRMINGHAM. ROYAL ORTHOPÆDIC HOSPITAL. 2 Locum REGISTRARS (orthopædics), resident or non-resident, required immediately. Salary £19 5s. per week—less residential charges where appropriate.

Applications to Secretary, Selly Oak Hospital Management Committee, Oak Tree-lane, Birmingham, 29.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of RESIDENT OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR for duties at the Queen Elizabeth Hospital and The Birmingham and Midland Hospital for Women (Professorial Unit) to commence duty at the earliest possible moment.

Forms of application with details of appointment may be obtained from, and should be returned not later than 3rd February, 1958, to, the House Governor, Birmingham and Midland Hospitals for Women, Showell Green-lane, Birmingham, 11.

G. A. PHALP, Secretary.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEON (resident). Vacant end February. Hospital is largest traumatic unit in country and treats over 50,000 new patients each year. Recognised for purpose of casualty by R.C.S. (Eng.). Teaching programme by consultant staff. 6-month appointment, some of which may be spent in 42-Bedded Medical Research Council's Burns Unit.

Apply, naming 2 referees, to Administrator.

BIRMINGHAM, 9. YARDLEY GREEN HOSPITAL. THORACIC SURGICAL UNIT. (66 Beds.) Vacancy for SENIOR HOUSE OFFICER. No previous experience in thoracic surgery necessary.

Applications, stating age, qualifications, training and experience, together with names of 2 referees, to be addressed to Group Secretary, Yardley Green Hospital, Birmingham, 9.

BIRMINGHAM. HEATHFIELD ROAD MATERNITY HOSPITAL, 134, Heathfield-road, BIRMINGHAM, 19. OBSTETRIC HOUSE SURGEON required 1st April, 1958. Preference given to candidates with previous medical and surgical experience. 50-Bed maternity unit with 18-cot premature-baby unit attached. Large Antenatal Department. Appointment recognised for D.Obst.R.C.O.G.

Detailed applications, with copies of 3 recent testimonials, to the Group Secretary, Dudley Road Hospital, Birmingham, 18.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology). Applications invited from registered or pre-registration practitioners. Vacant 1st March, 1958. Recognised for D.Obst. R.C.O.G. Departmental beds 69.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Royal Infirmary, Blackburn

HOUSE SURGEONS (2) required for end of January, 1958. Posts recognised for F.R.C.S. and approved for pre-registration purposes.

Victoria Hospital, Accrington (114 Beds)

HOUSE SURGEON required for 6th March, 1958. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Applications to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. GROUP LABORATORIES. RESIDENT PATHOLOGIST (Senior House Officer grade). Now vacant, tenable for 12 months and recognised for the Dip.Path.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, Boscombe. **BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the immediate appointment of GENERAL HOUSE SURGEON. The post is recognised for the F.R.C.S. examination and pre-registration purposes.

Application to the Hospital Secretary.

BRECHIN, ANGUS. STRACATHRO HOSPITAL. (676 Beds.) House Officers. The following pre-registration appointments are vacant for the 6 months commencing 1st February, 1958 :—

HOUSE SURGEONS (2), general surgery.
HOUSE SURGEON (1), orthopædic surgery.

Applications should be addressed to the Group Medical Superintendent.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE GROUP HOSPITALS. (78 Beds.) SENIOR HOUSE OFFICER for duties in the E.N.T. Department of the above Hospitals. Vacant beginning of February. Recognised for F.R.C.S. and D.L.O.

Applications, with details of experience, &c., together with the names of 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON to the Orthopædic Unit. Salary in accordance with national scales. This post is recognised as a pre-registration appointment. Vacant 12th February, 1958.

Applications, stating age, qualifications, and experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton.

BRIGHTON, 7. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) RESIDENT PATHOLOGIST (Senior House Officer grade) required for Area Laboratory. Good experience in all branches of clinical pathology.

Applications, stating age, qualifications, experience and naming 2 referees, to the Administrative Officer.

BRIGHTON, 7. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) Locum RESIDENT ANÆSTHETIST (Senior House Officer) required at the above Hospital for 2 weeks, commencing 23rd February, 1958.

Applications, stating usual particulars and naming 2 referees, to the Administrative Officer.

BRIGHTON. SUSSEX EYE HOSPITAL. (56 Beds.) HOUSE SURGEON required 11th February, 1958. Recognised for F.R.C.S. and D.O. Successful candidate will be considered for senior post (Senior House Officer) on completion of 6 months.

Applications, stating age, qualifications and experience and naming 2 referees, to the Administrative Officer.

BROMSGROVE GENERAL HOSPITAL. General Practitioner CLINICAL ASSISTANT in Orthopædics to undertake 2 notional half-days per week, at the rate of £367 10s. p.a.

Details of the appointment may be obtained from the Secretary of the Committee, Mid-Worcestershire Hospital Management Committee, Birmingham-road, Bromsgrove, to whom applications should be addressed.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Pathology required 1st April, 1958, at Frenchay Hospital (542 Beds, general medicine, general surgery and thoracic, neurosurgical and plastic units for the South West). Post may be resident or non-resident but residence essential when on call. It provides training in all branches of clinical pathology. Laboratory is recognised for Diploma in Pathology. Some duties in connection with the Regional Blood Transfusion Service.

Detailed applications, quoting 2 referees, should reach the Group Secretary, Frenchay Hospital, Bristol, by 10th February, 1958.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Frenchay Hospital. SENIOR HOUSE OFFICER, Regional Department of Neurosurgery. Vacancy occurs end of February, 1958, for the above post, tenable for 6 to 12 months. The post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." 2 referees required.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. RESIDENT REGISTRAR (Male) at Brookfields Hostal, Cambridge. This Hospital has 2 wards for infectious diseases, 1 for general medicine and 1 for tuberculosis, and is the poliomyelitis centre for the south-west section of East Anglia. Appointment for 1 year in first instance, renewable for a second year.

Apply, with full particulars and names of 3 referees. to Secretary, Addenbrooke's Hospital, Cambridge, by 8th February.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. ADDENBROOKE'S HOSPITAL, CAMBRIDGE. SURGICAL REGISTRAR (non-resident) from early March, for 1 year in first instance, renewable for second year.

Apply, with full particulars and names of 3 referees, to Secretary by 8th February.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of OBSTETRIC HOUSE SURGEON, which is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G., becomes vacant early in February, 1958. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR REGISTRAR or REGISTRAR to the Department of Physical Medicine in this teaching hospital group, where there are opportunities for postgraduate study.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARLISLE. CUMBERLAND INFIRMARY, CITY GENERAL HOSPITAL AND CITY MATERNITY HOSPITAL. Applications are invited for the following appointments :—

HOUSE OFFICERS, recognised for pre-registration purposes.
2 general surgery (recognised for F.R.C.S.).
1 gynecology and obstetrics.

SENIOR HOUSE OFFICERS.
1 orthopædics.
1 general surgery (recognised for F.R.C.S. examination).

Applications to be sent immediately to the Group Secretary, Cumberland Infirmary, Carlisle.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the posts of JUNIOR HOSPITAL MEDICAL OFFICER and HOUSE SURGEON in Orthopædic Surgery at Law Hospital, Carluke (790 Beds). The unit consists of 120 Beds and deals with acute orthopædic and accident work from a large part of Lanarkshire, and offers excellent experience.

Applications, giving full details, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (medical) for 1st February, 1958.

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the post of RESIDENT HOUSE SURGEON (pre- or post-registration) for the 6 months commencing 1st February, 1958.

Applications, stating age, qualifications and any previous experience, together with the names of 2 referees, should be sent to the Group Medical Superintendent, Law Hospital, Carluke.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Pre-registration HOUSE OFFICER (surgical) (recognised by the Royal College of Surgeons, and for pre-registration service), which will become vacant on 1st February, 1958. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience and nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgical) (recognised by the Royal College of Surgeons), which is now vacant. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, and names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CAERPHILLY HOSPITAL (general hospital, 228 Beds—6 miles from Cardiff). HOUSE SURGEON. Post recognised for F.R.C.S.

Apply to Hospital Secretary.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) HOUSE SURGEON required (pre- or post-registration). Vacant now. The post offers a wide experience in general surgery, gynæcology, and orthopædic surgery. Post recognised for the F.R.C.S.

Applications, with names of 2 referees, to be sent to Secretary, General Hospital, Cheltenham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (Senior House Officer or Intern) required for Gynæcological (30 Beds) and E.N.T. (approximately 14 Beds) Departments. Salary in accordance with terms and conditions of National Health Service. Post vacant 1st February, 1958.

Applications, together with names and addresses of referees, to Physician-Superintendent, St. Peter's Hospital, as soon as possible.

CHESTER. BARROWMORE HOSPITAL, Great Barrow, CHESTER. Male SENIOR HOUSE OFFICER (medical) required. Salary £819 10s. p.a., less £150 for residence. The Hospital, which is modern and for the treatment of pulmonary tuberculosis, contains a regional thoracic surgical unit and a general chest ward. Applications from ex-patients considered.

Inquiries and applications, stating names of 2 referees, to be sent to Physician-Superintendent.

CHESTERFIELD ROYAL HOSPITAL. House Physician (Senior House Officer grade) required mid-February at the above Hospital for 54-bed Medical Unit. Post offers good experience in general medicine, and in pædiatrics, diabetics, and dermatology. National salary and conditions.

Further particulars obtainable on request from the Group Secretary, Chesterfield Hospital Management Committee, to whom applications should be submitted immediately.

CHESTER-LE-STREET, Co. DURHAM. GENERAL HOSPITAL. HOUSE SURGEON (general surgery). Approved pre-registration appointment, and recognised under the F.R.C.S. regulations. Post vacant 1st February, 1958.

Apply, with names and addresses of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for appointment of SURGICAL REGISTRAR (Resident Surgical Officer) for 1 year (renewable) from 7th April for duty primarily at Royal West Sussex Hospital, Chichester (202 Beds.) Post recognised for F.R.C.S. 7 residents (4 surgical) of whom Resident Surgical Officer the senior. Salary £935 first year, £1061 10s. second, each less £170 for residence. Candidates may visit hospital.

Forms from Group Secretary, 174, Broyle-road, Chichester, to be submitted by 8th February.

CHICHESTER. ST. RICHARD'S HOSPITAL. (400 Beds.) CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON (pre-registration) for 6 months only in the first instance. Post vacant now. The man or woman appointed will work primarily in the surgical wards of the Hospital. Hospital recognised for F.R.C.S.

Applications, stating age, qualifications and experience, giving names of 2 persons from whom reference may be obtained, should be sent to the Surgeon-Superintendent.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (189 Beds)

Post of HOUSE SURGEON. Recognised for F.R.C.S.

First, second, third or pre-registration post, tenable for 6 months.

St. Mary's Hospital, Colchester

Post of SENIOR HOUSE OFFICER (Resident Medical Officer) for Geriatric Unit. Includes duties in connection with medical and surgical patients accommodated at hospital and duties at Essex County Hospital (general medical). Post tenable for 6 or 12 months. Resident.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (108 Beds—acute, and continuation 32 Beds.) SENIOR HOUSE OFFICER (casualty) required. Approved for F.R.C.S. Vacant March. Modern well equipped department. Whitley Council salary scale and conditions of service.

Applications, stating age, qualifications, &c., with names of 2 referees, to reach the Group Secretary, South Cheshire Hospital Management Committee, Barony Hospital, Nantwich, Cheshire, not later than 8th February, 1958.

CUCKFIELD HOSPITAL, Cuckfield, near Haywards HEATH, SUSSEX. RESIDENT JUNIOR HOUSE PHYSICIAN. Pre-registration post, vacant 11th February, 1958. Tenable 6 months.

Applications, stating age, nationality, qualifications and experience, to Group Secretary, Mid-Sussex Hospital Management Committee.

DERBY. CITY HOSPITAL. Derby No. 1 Hospital Management COMMITTEE. Applications are invited for the posts of HOUSE SURGEONS (2 vacancies) (pre-registration) or SENIOR HOUSE OFFICER (surgical). Posts vacant early in March.

Applications, stating full details, together with copies of 2 recent testimonials, should be sent to the Medical Superintendent, City Hospital, Derby, as soon as possible.

DERBY. CITY HOSPITAL. Derby No. 1 Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Surgery. This post is recognised for the F.R.C.S. Vacant beginning of March.

Applications, stating full details, together with copies of 2 recent testimonials, should be sent to the Medical Superintendent, City Hospital, Derby, as soon as possible.

DERBY. CITY HOSPITAL. Derby No. 1 Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE PHYSICIAN (Senior House Officer) (medicine) for duties in General Medicine and Paediatrics. Post vacant early in March.

Applications, stating full details, together with copies of 2 recent testimonials, should be sent to the Medical Superintendent, City Hospital, Derby, as soon as possible.

DERBY. CITY HOSPITAL. Derby No. 1 Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE PHYSICIAN (pre-registration) or SENIOR HOUSE OFFICER (medicine) for duties in General Medicine. Post vacant early in March.

Applications, stating full details, together with copies of 2 recent testimonials, should be sent to the Medical Superintendent, City Hospital, Derby, as soon as possible.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) HOUSE PHYSICIAN (pre-registration) or SENIOR HOUSE OFFICER (general medicine). Vacant late February.

Apply, stating full details with copies of 2 testimonials, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER (general surgery). 2 posts vacant 9th and 19th March. Recognised for F.R.C.S. if held by Senior House Officer.

Apply, stating full details, with copies of 2 recent testimonials, to Secretary.

DERBY. DERBYSHIRE HOSPITAL FOR WOMEN, FRIAR GATE. HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER (gynæcology) required. Recognised for M.R.C.O.G. in gynæcology only.

Apply, stating full details, with copies of 2 recent testimonials, to Hospital Secretary, Derbyshire Hospital for Women.

DEVON MENTAL HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICERS required at Exminster Hospital, near Exeter (1629 (mental) beds), and Digby-Wonford Hospital (611 (mental) beds). Previous psychiatric experience advisable but not essential if candidate has good general experience. Salary scale £852 10s.–£55–£1182 10s. Accommodation is available for single or married officers. Whitley Council terms and conditions of service.

Applications, giving age, nationality, qualifications and experience, with names of 2 referees, to the Group Secretary, Devon Mental Hospital Management Committee, Exminster Hospital, near Exeter, as soon as possible.

DORCHESTER. DORSET COUNTY HOSPITAL. (100 Beds.) HOUSE SURGEON required for resident, pre-registration post now vacant and tenable for 6 months. Recognised for F.R.C.S. examinations.

Applications, stating age, qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

DUNDEE. WESTGREEN MENTAL HOSPITAL. Teaching School for Queen's College, St. Andrew's University. Appointment of JUNIOR HOSPITAL MEDICAL OFFICER. Salary according to national scale. House in grounds is available for married man at appropriate rental.

Applications, stating age, nationality, qualifications and experience with recent testimonials, should be sent to the Physician-Superintendent.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR, United Norwich Hospitals. Recognised for D.A. and F.F.A. R.C.S. Appointment for 1 year, renewable for second year.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 10th February, 1958. Candidates are invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital, Norwich.

EPSOM, SURREY. HORTON HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGION. 2 PSYCHIATRIC REGISTRARS required. Previous psychiatric experience necessary. Single resident accommodation available. The Hospital deals with all types of psychiatric illness, experience may be gained in all modern physical occupational and psychotherapeutic methods. Attendance at psychiatric outpatient clinics in London is obligatory. Facilities afforded for attending courses of instruction in London for the D.P.M.

Application forms obtainable from the Secretary, Horton Hospital, Epsom, Surrey, to whom they should be returned, duly completed, within 2 weeks from the appearance of this advertisement.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) RESIDENT SENIOR CASUALTY HOUSE OFFICER required at above Hospital. Post vacant 15th February, 1958, and recognised for F.R.C.S. purposes.

Apply, stating age, nationality, qualifications and experience, together with the names and addresses of 2 referees, to Group Secretary, Edgware General Hospital, by 8th February, 1958.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Anæsthetics. Regional Training Scheme includes facilities for gaining experience in specialist techniques at regional centres for plastic, thoracic and neurosurgery. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, by 4th February, 1958.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY REGISTRAR, whole-time, required at above Hospital, which may be visited by direct appointment with Medical Director.

Application forms obtainable from and returnable to Group Secretary, Edgware General Hospital, by 4th February, 1958.

EDINBURGH. PRINCESS MARGARET ROSE ORTHOPÆDIC HOSPITAL. Applications are invited from registered medical practitioners for appointments as SENIOR HOUSE OFFICERS (resident) in the adult and children's wards of the above Hospital for periods of 6 months commencing 1st April, 1958. National Health Service scale.

Applications, stating age, qualifications and experience, the names of 2 referees, and preference for adult or children's work, to be sent immediately to the Secretary, Edinburgh Central Hospitals, 1, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON, pre-registration post. Vacant 3rd March, 1958. Duties with general surgical unit, doing some genito-urinary work. Post recognised by the Royal College of Surgeons. 6 months' appointment.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital.

FARNBOROUGH HOSPITAL, Kent. (800 Beds.) House SURGEON required 4th March. Recognised for F.R.C.S. Pre-registration post.

Apply, stating age, qualifications with dates, and experience, and naming 3 referees, to Administrative Officer by 17th February, 1958. (Ref. H.S.)

GRIMSBY GENERAL HOSPITAL. Applications are invited for CASUALTY OFFICER (Senior House Officer grade) with some E.N.T. duties. Appointment recognised for F.R.C.S. The staffing of the department is a Senior Casualty Officer and 2 Senior House Officers. Up-to-date medical library and reading facilities available.

Applications, with names and addresses of 2 referees, to Hospital Secretary.

HALIFAX. ROYAL HALIFAX INFIRMARY. Senior HOUSE OFFICER in Anæsthetics required. Post recognised for F.F.A.R.C.S. and D.A. Salary £819 10s. p.a. less £150 p.a. for board residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HAREFIELD HOSPITAL REGIONAL THORACIC SURGICAL UNIT, HAREFIELD, MIDDLESEX. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SURGICAL REGISTRAR to the Harefield Thoracic Surgical Unit which serves the North West Metropolitan Region. In the Hospital there are 90 Beds for non-tuberculous surgical chest conditions and 360 Beds for tuberculosis. The appointment thus affords a wide experience in all aspects of thoracic surgery. Candidates must have had previous surgical experience and preference will be given to candidates with a higher surgical qualification. The appointment will be held in the first instance for 1 year.

Application forms obtainable from and returnable to the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 11th February, 1958.

HASTINGS AND ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (91 Beds.) HOUSE SURGEON required for gynæcological beds (32) in hospital for obstetric and gynæcological patients only. Appointment recognised for M.R.C.O.G. is vacant Monday, 24th February, 1958. Candidates for pre-registration service (surgery) can be considered.

Applications, giving names and addresses of 3 referees, to be sent to the Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) Applications are invited for the post of HOUSE SURGEON (surgery/E.N.T.—pre-registration), vacant on 20th February, 1958. This Hospital is the main surgical hospital in the Hastings area and the post offers excellent experience.

Apply, with 2 testimonials or the names of 2 referees, to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) Applications are invited for the post of CASUALTY AND ORTHOPÆDIC HOUSE SURGEON, 1 of 2 similar posts graded Senior House Officer. Post vacant 22nd February, 1958.

Apply, with 2 testimonials or the names of 2 referees, to the Hospital Administrator.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of RESIDENT HOUSE PHYSICIAN (Male or Female), second post held. Recognised pre-registration post. 6 months' appointment. Preference given to applicants who have held resident surgical or medical posts in general hospital. Duties to commence mid-February, 1958.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general surgery, gynæcology and obstetrics). First or second post. To commence as soon as possible. Pre-registration post; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.) 2 HOUSE SURGEONS, combined posts in obstetrics and gynæcology, recognised for D.Obst.R.C.O.G. and M.R.C.O.G. Posts vacant beginning of March.

Apply, stating age, nationality, qualifications and experience, and enclosing copies of not more than 3 recent testimonials, to Medical Director by 3rd February.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. 2 HOUSE SURGEONS (pre-registration) required.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from provisionally registered medical practitioners for the post of HOUSE PHYSICIAN, to commence duties on 1st March, 1958. Salary in accordance with national scales.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD. ST. LUKE'S HOSPITAL. (235 Beds.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) at the above Hospital, to commence duties immediately. The Group Geriatric Admission Unit is based on this Hospital, which also caters for acute medical and surgical, pædiatric and maternity patients. Salary in accordance with the terms and conditions of service for hospital medical and dental staff, £852 10s.–£55–£1182 10s. p.a. House available for married candidate.

Applications, together with copies of 3 recent testimonials, to be sent to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. HOUSE SURGEON required immediately. Recognised for D.C.H. An interesting and varied post which includes outpatient and casualty work.

Applications, together with details of experience, testimonials, &c., to the Hospital Secretary.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical) now vacant. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

ILFORD. KING GEORGE HOSPITAL, Eastern-avenue. There will be a vacancy for a HOUSE PHYSICIAN at above Hospital on 21st February, 1958. 1st or 2nd post pre-registration. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary Ilford, and
Barking Group Hospital Management Committee.

King George Hospital.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (356 Beds.) Applications are invited for 2 posts of HOUSE SURGEON to Consultant General Surgeons, both vacant mid-January. The posts are recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL, Anglesea-ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the E.N.T. and Ophthalmic Departments. The post is recognised for pre-registration and for the D.L.O. examination.

Applications, giving full particulars and copies of recent testimonials, to Hospital Secretary.

KETTERING AND DISTRICT GENERAL HOSPITAL. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. The post, vacant now, offers wide experience of all traumatic conditions including fractures and some orthopædic cases with charge of 30 Beds.

Applications, accompanied by testimonials, to be sent to the Group Secretary, General Hospital, Kettering.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) RESIDENT SENIOR HOUSE OFFICER (surgical). The successful applicant will work with a consultant surgical unit and attend at consultative clinics. The post, recognised for F.R.C.S., is vacant 1st March next.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) RESIDENT SENIOR HOUSE OFFICER (orthopædics). The successful applicant will work with an orthopædic and traumatic specialist unit. The post, recognised for F.R.C.S., is vacant on 1st April next.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

LEEDS. UNITED LEEDS HOSPITALS / LEEDS REGIONAL HOSPITAL BOARD.

REGISTRAR in Neurology for duties divided between the Department of Neurology at The General Infirmary at Leeds (20 Beds) and Pinderfields General Hospital, Wakefield (38 Beds).

SENIOR REGISTRAR in Radiology at The General Infirmary at Leeds (7 notional half-days per week) and The County Hospital, York (4 notional half-days per week).

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 12th February, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Registrar in Anæsthetics, Huddersfield Group (approximately 225 Beds in the surgical specialties). Non-resident.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 12th February, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies

Anæsthetics

Hull A, B, and East Riding Groups. Recognised for the F.F.A. R.C.S. Duties may include thoracic anæsthesia. Non-resident. Post vacant 1st April, 1958.

General Medicine

St. James's Hospital, Leeds (206 general medical beds). Duties those of Resident Medical Officer. Post vacant 1st April, 1958.

General Surgery

Dewsbury, Batley and Mirfield Group (120 general surgical beds), may include some duties in the Casualty Department. Resident.

Hull Royal Infirmary (80 general surgical beds), and other hospitals in the Hull A Group. Duties those of Resident Surgical Officer and includes additional duties in the Casualty Department.

Otley General Hospital (42 general surgical beds). Recognised for the F.R.C.S. Consultant staff mainly from Leeds Teaching Hospital. (Resident married quarters available.) Post vacant 1st April, 1958.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, the Joint Registrars Committee, Park-parade, Harrogate, by 29th January, 1958.

LEICESTER ISOLATION HOSPITAL AND CHEST UNIT, Groby-road, LEICESTER. (328 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER (surgical). Salary £819 10s. p.a. less £150 residential emoluments. The appointment is tenable for 6 months, and may be extended for a further period of 6 months. Experience will be gained in all branches of thoracic surgery, including cardiac surgery. The post is recognised for the Final Fellowship.

Applications, giving, qualifications, dates, &c., and copies of 2 recent testimonials, to be forwarded as soon as possible to the Department of Thoracic Surgery at the above Hospital.

LEICESTER ISOLATION HOSPITAL AND CHEST UNIT. (266 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR (chest and infectious diseases) required. This Hospital offers interesting work, having units for infectious diseases and all forms of chest diseases, complete thoracic surgical unit and outpatient sessions for chest diseases and cardiology. Single accommodation is available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 3rd February, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LEICESTER. TOWERS MENTAL HOSPITAL. (1168 Beds.) Applications are invited for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER. Salary £852 10s. –£55–£1182 10s. There is ample opportunity for experience in all branches of psychiatry including outpatient work and the Hospital is recognised for D.P.M. experience. Facilities for post-graduate training exist at Sheffield University. Resident accommodation is available for a single man or woman, for which the appropriate charge will be made. Candidates must have completed their service with H.M. Forces.

Applications, giving age, nationality, and full details with the names of 2 referees, to be sent to the Medical Superintendent as as soon possible.

LEIGH INFIRMARY, Leigh. House Surgeon, pre-regis-tration post.

Applications, with names of 2 referees, to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

LINCOLN COUNTY HOSPITAL, Sewell-road. (200 Beds.) Applications are invited from pre-registration candidates for appointment as HOUSE SURGEON for 6 months, commencing in February, 1958, to be followed, if satisfactory, by appointment as House Physician for a further 6 months.

Full particulars should be sent to R. W. HOWICK, Group Secretary.

LINCOLN. ST. GEORGE'S HOSPITAL. (242 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (pædiatrics) required. Duties include care of newborn and premature babies, exchange transfusions, neonatal surgery and duties at a maternity unit at Lincoln County Hospital. This post offers excellent opportunity for the study of metabolic diseases in childhood and infancy. A new cubicled unit is being opened. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 3rd February, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LIVERPOOL. NORTH LIVERPOOL HOSPITAL MAN-AGEMENT COMMITTEE. Vacancies will soon be available as follows :—

HOUSE SURGEON at Bootle Hospital, from 22nd January.
HOUSE PHYSICIAN at Bootle Hospital, from 1st March.
Both recognised for pre-registration service.
RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER at Waterloo Hospital, from 16th February.

Applications, with names of 2 referees, to Secretary, Walton Hospital, Liverpool, 9.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of Locum SENIOR REGISTRAR in Pathology for duty at the David Lewis Northern Hospital for the period to 28th February, 1959.

Apply as soon as possible on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a temporary appointment to the post of REGISTRAR in Pathology for duties at the Women's Hospital for the period to 30th September, 1958. The person appointed will be eligible to apply in the summer for appointment for the year beginning 1st October, 1958.

Apply by 15th February on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. WALTON HOSPITAL. (1285 Beds.) Vacancies will occur on 1st March for :—

SENIOR HOUSE OFFICER in E.N.T. Recognised for D.L.O.

SENIOR HOUSE OFFICERS (2) in Obstetrics and Gynæcology, for term of 1 year. Recognised for M. and D.Obst.R.C.O.G.

SENIOR HOUSE OFFICER in Pathology. Selected applicant will be afforded experience systematically in each section of the new Department of Pathology, in turn.

SENIOR HOUSE OFFICER in Regional Neurosurgical Unit. Recognised for F.R.C.S. diploma. Term of 1 year, renewable.

HOUSE OFFICERS (2) in General Medicine and (1) in General Surgery. Recognised for pre-registration service.

Apply to Physician-Superintendent, giving names of 2 referees and details of age, nationality and qualifications.

LICHFIELD (near). ST. MATTHEW'S HOSPITAL, BURNTWOOD, LICHFIELD, STAFFORDSHIRE. (1530 mental beds.) BURTON-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) required. Resident accommodation available. Facilities for taking a D.P.M. course at Birmingham University.

Applications, with 2 references, to the Medical Superintendent.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. HOUSE SURGEON, post now vacant. Tenable for 6 months. Recognised as pre-registration post and for F.R.C.S.

Applications stating age, nationality, qualifications and experience, together with copies of two recent testimonials, to the Secretary of the Hospital.

MACCLESFIELD HOSPITAL. Applications invited for SENIOR HOUSE OFFICER ANÆSTHETIST. Resident or non-resident. Main duties Infirmary Branch. Hospital recognised F.F.A. R.C.S. and D.A. Excellent facilities for study.

Apply immediately to Group Secretary, Macclesfield and District Hospital Management Committee, Willerby House, Cumberland-street, Macclesfield.

MAIDENHEAD HOSPITAL, Berkshire. Applications invited for post of SENIOR HOUSE OFFICER (medical) for Maidenhead General Hospital with duties at St. Mark's and Isolation Hospitals, Maidenhead. Appointment for 1 year, commencing 1st February.

Applications, stating age, qualifications, experience and nationality, and 3 testimonials or names of 3 referees, to Secretary.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant end of January, 1958. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £819 10s. a year, less £150 a year for residential emoluments.

Applications to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON, 6 months' appointment. Post vacant mid-January, 1958. Salary at the rate of £467 10s.–£577 10s. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £819 10s. p.a. less £150 p.a. for board and lodging. Post vacant February, 1958.

Applications to the Administrative Officer at the Hospital.

MANCHESTER REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (resident) required at Birch Hill Hospital, Rochdale. Accommodation for married man available if required. Post recognised for 6 months' F.R.C.S. experience and tenable for 1 year in first instance.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs, giving usual details.

MANCHESTER, 20. CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from resident medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (radiotherapy) at the above Hospital. Suitable applicants will be eligible for the D.M.R.T. course commencing in April, 1958.

Applications, with full details and the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade). Candidates must have held house appointments but previous laboratory experience is not essential. Suitable for candidates interested in obstetrics and/or pædiatrics wishing to obtain laboratory experience. The duties will be mainly in the Department of Clinical Pathology, Saint Mary's Hospitals, but the holder of the post will also spend some time in the Manchester Royal Infirmary.

Application to be made on forms obtainable from the undersigned and submitted by 31st January, 1958.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications invited for post of SENIOR HOUSE OFFICER in Obstetrics for 12 months from 1st April, 1958. Previous hospital experience in general medicine and surgery, and in obstetrics necessary. Recognised for M.R.C.O.G. examination. Duties involve clinical responsibility for mothers and babies and supervision of work of pre-registration House Officers. National scales.

Application forms from the undersigned, to be returned by 10th February, 1958. A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications invited for 3 posts of SENIOR HOUSE OFFICER in Gynæcology for 6 months from 1st April, 1958. Previous hospital experience in medicine and surgery necessary. Recognised for M.R.C.O.G. examination. National scales.

Application forms from the undersigned, to be returned by 10th February, 1958. A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER to the Regional Oral Surgery and Maxillo-Facial Unit at the above Hospital. The post provides every opportunity to study for F.D.S. and has R.C.S. recognition.

Applications, with full details, including the names of 2 referees, should be forwarded to the Group Secretary.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE PHYSICIAN, Male or Female, at the above Hospital. The medical unit consists of 52 beds and has an establishment for 2 pre-registration House Physicians, 1 post being already occupied.

Applications, stating age, qualifications, and experience, together with names of 2 referees, should be addressed to the Hospital Secretary.

MIDDLESBROUGH (near). HEMLINGTON HOSPITAL. TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for Neurosurgical Department of 24 Beds. Post offers wide experience in neurology. No previous experience necessary.

Applications, with names of 2 referees, to be sent to the Hospital Secretary.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR SURGEON, whole-time, Darlington Group of hospitals—Darlington Memorial Hospital. Post recognised for F.R.C.S. and available 21st March, 1958. Single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR OBSTETRICIAN AND GYNÆCOLOGIST, whole-time, resident. Darlington Group of hospitals—Greenbank Maternity (71 maternity beds), Darlington Memorial (26 gynæcological beds). Post recognised for M.R.C.O.G. and available 17th April, 1958. Single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Special AREA FOR CUMBERLAND AND NORTH WESTMORLAND. EAST CUMBERLAND GROUP OF HOSPITALS. SURGICAL REGISTRAR (resident) (whole-time) required for 1 year in the first instance, with the likelihood of extension. Main duties at the Cumberland Infirmary, Carlisle (332 Beds), where the Registrar will have duties in the Casualty Department and in the wards. The post is recognised under the F.R.C.S. regulations.

Applications, together with names and addresses of 1–3 referees, and/or 1–3 testimonials, to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWBURY DISTRICT HOSPITAL, Newbury, Berkshire. (90 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER (general surgery); married quarters available.

Write, stating age, qualifications with dates, nationality and present post, together with the names of 3 referees, to Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the following posts :—

SENIOR HOUSE OFFICER (medical), vacant 6th March, 1958.

SENIOR HOUSE OFFICER (surgical), vacant 15th March, 1958.

The posts are tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applica-tions are invited for the post of HOUSE SURGEON, vacant 15th February, 1958. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applica-tions are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer). Previous experience an advantage. Post vacant immediately.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE PHYSICIAN vacant on 15th February, 1958. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. FIRS MATERNITY HOSPITAL. (40 Beds.) Required RESIDENT SENIOR HOUSE OFFICER (obstetrics). Post vacant 8th March, 1958. Recognised for D.Obst.R.C.O.G. Previous experience in obstetrics an advantage.

Applications, with copies of 3 testimonials, to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (casualty), duties to commence about 14th February. Establishment 3. Recognised for F.R.C.S. Post offers wide experience of casualty work.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident Pre-registration HOUSE SURGEONS required, 4th February, 5th February.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NORWICH (near). LITTLE PLUMSTEAD MENTAL DEFICIENCY HOSPITAL. (1000 Beds.) Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER. The Hospital is modern, has a large outpatient service and admits many young patients for short periods for physical and mental investigation. Interest in physical medicine is encouraged. Married or single quarters available.

Applications, with the names and addresses of 2 referees, to the Medical Superintendent, Little Plumstead Hospital, near Norwich, Norfolk, by 31st January, 1958.

NORWICH. ST. ANDREW'S HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER (Male) for duty at the Mental Hospital of 240 Beds at Great Yarmouth which is to be attached to the St. Andrew's Group as from 1st April, 1958. Accommodation available for a single or married man. National Health Service salaries and conditions apply. Previous experience in psychiatry desirable but not essential.

Further particulars may be obtained from the Medical Superintendent, St. Andrew's Hospital, Thorpe, Norwich, to whom applications, giving details of age, qualifications, experience, and the names of 2 referees, should be addressed as soon as possible.

OXFORD. NUFFIELD ORTHOPÆDIC CENTRE, Headington, Oxford. Applications are invited from suitably qualified persons for a SENIOR HOUSE OFFICER grade appointment from 1st March, 1958.

Applications, with names of referees, to the Secretary as soon as possible.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. House PHYSICIAN (resident, Male), post vacant 7th February, 1958. Recognised pre-registration post which offers excellent experience.

Applications should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, Devon.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. SENIOR HOUSE OFFICER in Anæsthetics, vacant 1st April, 1958. Recognised for the D.A., and F.F.A. R.C.S.

Applications, giving age, nationality and experience, with names of 3 referees, to be sent to the Group Secretary, 7, Nelson-gardens, Stoke, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORN-WALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department SENIOR HOUSE OFFICER in Casualty, vacancies 1st February, 1st April, 1958. Recognised for the F.R.C.S.

Applications, stating names of 3 referees, to be sent to the Group Secretary.

PORTSMOUTH AND ISLE OF WIGHT AREA PATHO-LOGICAL SERVICE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in Pathology. The successful candidate will be expected to do a tour of duty in the departments of bacteriology, hæmatology, histology and biochemistry at the Central Laboratory, and may also be required to work in any of the laboratories covered by the Service. The Laboratory is recognised for the Diploma of Pathology. Vacant 1st April, 1958.

Forms of application may be obtained from the Group Secretary, Portsmouth Group Hospital Management Committee, Saint Mary's Hospital, Milton Road, Portsmouth, which should be returned to him, duly completed, on or before 3rd February, 1958. Canvassing will disqualify. Candidates may visit the Central Laboratory, Milton-road, Portsmouth, by arrangement with the Senior Pathologist.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Saint Mary's Hospital**

(*a*) PÆDIATRIC HOUSE PHYSICIAN. Vacant 8th February, 1958.

(*b*) HOUSE SURGEON (pre-registration). Vacant 30th January, 1958, 1st February, 1958, 9th February, 1958, 11th February, 1958.

(2) **Royal Portsmouth Hospital**

PÆDIATRIC MEDICAL HOUSE PHYSICIAN. Vacant 1st February, 1958.

(3) **Queen Alexandra Hospital**

HOUSE SURGEON (pre-registration). Vacant 12th February, 1958.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

READING AREA DEPARTMENT OF MEDICINE. READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE PHYSICIAN, vacant 1st March, 1958, for a period of 6 months. Successful candidates will be required to carry out duties at the following Reading hospitals: Royal Berkshire Hospital (397 Beds), Battle (374 Beds), and Prospect Park (104 Beds).

Write immediately, stating age qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Reading AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON in the Accident and Orthopædic Department. F.R.C.S. recognised. Also casualty duties.

Apply, stating age, qualifications with dates, nationality, present post, with copy of recent testimonial, to Secretary.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners for the resident post of HOUSE SURGEON to the above Department. The appointment, which is vacant on the 19th February, 1958, is for 1 year, with 6 months' gynæcology at the Royal Berkshire Hospital, and 6 months in the maternity unit at Battle Hospital. Both appointments are recognised for the Diplomas of the Royal College of Obstetricians and Gynæcologists.

Write, stating age and qualifications with dates, nationality and present appointment, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (397 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered and provisionally registered medical practitioners for the resident post of HOUSE PHYSICIAN in the Pædiatric Department, vacant 1st March, 1958, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (397 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered and provisionally registered medical practitioners for the resident post of HOUSE SURGEON, vacant 1st March, 1958, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited from pre-registration or registered medical practitioners for the post of HOUSE SURGEON. Post tenable for 6 months as from 1st February, 1958. Recognised for F.R.C.S.

Applications, with 2 testimonials, to be sent forthwith to Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

RICHMOND, SURREY. ROYAL HOSPITAL. Senior HOUSE SURGEON (resident) required 6th February, 1958, for busy general hospital of 121 Beds with full consultant staff.

Apply, giving age, qualifications, experience and names of 2 referees, to Administrative Officer, immediately.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (622 Beds.) SENIOR HOUSE OFFICER required for Geriatric Unit at the above Hospital. Post vacant approximately 1st March, 1958. A wide range of facilities are available at the Hospital for the investigation, treatment and rehabilitation of acute and chronic cases.

Applications, stating age, &c., to be sent to the Secretary at the above Hospital as soon as possible.

ROCHFORD GENERAL HOSPITAL. (622 Beds.) Required, Locum SENIOR HOUSE OFFICER (general medicine) for period 6th–23rd February inclusive.

Applications to Secretary at the above Hospital as soon as possible.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (622 Beds.) Locum REGISTRAR in Pathology required from 1st February, 1958, on month-to-month basis, pending appointment being made by the Regional Hospital Board.

Applications to the Secretary as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEON required from 24th January, 1958. Open to either pre-registration applicants or to fully registered practitioners.

Apply immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (resident or non-resident) required for duties in the Casualty Department. Available for Male or Female applicants. This is a large general hospital with specialised departments dealing with all types of acute medical and surgical cases. The post affords good opportunity for gaining tuition and experience.

Applications should be forwarded immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. SENIOR HOUSE OFFICER (Male or Female) required from 5th February, 1958. Duties include work in general medicine and in the regional poliomyelitis unit (30 Beds) where excellent experience of modern methods can be obtained. Resident post.

Applications to the Medical Superintendent.

ROMFORD. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT SENIOR HOUSE SURGEON required from 11th February, 1958. Recognised for the F.R.C.S. Good experience in busy surgical unit.

Applications should be forwarded immediately to Medical Superintendent, stating also names of 2 referees.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT HOUSE PHYSICIAN (Male or Female) required from 7th February, 1958. This Hospital provides for acute medical, surgical and infectious patients. The post, which is also open to pre-registration candidates, offers good opportunities for gaining experience in both general medicine and fevers.

Applications should be addressed immediately to the Medical Superintendent, stating also names of 2 referees.

SALFORD. LADYWELL HOSPITAL. (Chest Unit—110 Beds.) SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. The post is tenable for a maximum period of 4 years. Previous experience in the treatment of pulmonary tuberculosis is desirable. There is a visiting Thoracic Surgeon and the surgery is undertaken at Baguley Hospital, Manchester, which is nearby. Salary in accordance with scale.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be submitted immediately to the Hospital Secretary, Ladywell Hospital, Salford, 5, Lancs.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time resident post of REGISTRAR in Psychiatry at Craig Dunain Hospital, Inverness.

Forms of application and further particulars may be obtained from the undersigned with whom applications should be lodged by 15th February, 1958.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Radiodiagnosis at the Royal Infirmary of Edinburgh. The work will include periods of duty at other hospitals in the region.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 15th February, 1958.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance.

SENIOR REGISTRAR in Psychiatry at Hawkhead Mental Hospital, Glasgow, and associated clinics. Small flat available if required.

SENIOR REGISTRAR in Pathology based at the Glasgow Royal Infirmary for duties in Lanarkshire.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 8th February, 1958.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. Applications are invited for the resident (pre-registration) post of HOUSE SURGEON in Orthopædics.

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to the Group Secretary, Sheffield No. 1 Hospital Management Committee, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD, 10. LODGE MOOR HOSPITAL. (467 Beds.) SHEFFIELD NO. 3 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER in Infectious Diseases, commencing late March, 1958. Candidates should have held a resident appointment in a hospital. Salary £819 10s. p.a. subject to a deduction of £150 p.a. for residential emoluments. The appointment is normally for 1 year, subject to 1 month's notice on either side.

Applications, stating age, qualifications, &c., to the Group Secretary, Sheffield No. 3 Hospital Management Committee, Lodge Moor Hospital, Sheffield, 10.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. RESIDENT SENIOR HOUSE OFFICER (obstetrics) required for the Jessop Hospital for Women. Post vacant 1st April, 1958.

Applications, with names of 3 referees, to be sent immediately to the Superintendent, Jessop Hospital for Women, Leavygreave-road, Sheffield, 3.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. THE ROYAL HOSPITAL. HOUSE OFFICER required at once for Orthopædic Department. Post now vacant. Pre-registration candidates will be considered.

Applications, with names of 2 referees, or copy testimonials, to Superintendent, Royal Hospital, West-street, Sheffield.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. THE CHILDREN'S HOSPITAL. Applications invited from registered medical practitioners for the vacant post of HOUSE PHYSICIAN (resident) to the professorial unit at the above Hospital.

Applications, stating age, qualifications and experience, with the names of 3 referees or copy testimonials, to be sent immediately to the Superintendent, Children's Hospital, Western Bank, Sheffield, 10.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (120 acute surgical and 50 orthopædic beds.) CASUALTY OFFICER (Senior House Officer). Post recognised for Casualty by R.C.S. Duties in casualty and orthopædic departments. Non-resident (single accommodation available).

Applications to Secretary, Southlands Hospital.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHREWSBURY. SHELTON MENTAL HOSPITAL. (1000 Beds.) SHREWSBURY HOSPITAL GROUP. JUNIOR HOSPITAL MEDICAL OFFICER. Appointment for 1 year in first instance. Single residential accommodation available. Recognised for D.P.M. Associated outpatient clinics.

Applications to Medical Superintendent.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Resident Locum ANÆSTHETIC REGISTRAR required 9th February–1st March.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.) HOUSE OFFICER required. Total establishment of 3 residents. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, to be submitted by 1st February, 1958, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (274 Beds) and SOUTHAMPTON GENERAL HOSPITAL (469 Beds). SENIOR HOUSE OFFICER (E.N.T.) required in February. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work. The Group includes a diagnostic and distributing hearing-aid centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) RESIDENT HOUSE SURGEON required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of ORTHOPÆDIC REGISTRAR to a team of 3 Orthopædic Surgeons at the above Hospital. This Hospital is the centre to which all trauma cases from a large industrial town and port are directed, thus providing excellent experience in the treatment of traumatic conditions; patients with orthopædic conditions are also drawn from a wide area. The successful candidate will be required to perform clinical duties at peripheral hospitals. The post, which becomes vacant in March, is recognised for the Fellowship.

Forms of application may be obtained from the undersigned, to whom they should be returned by 12th February, 1958.

FRANK JENNINGS, Group Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Orthopædic Surgery to fill a vacancy in the approved trainee establishment at the Hastings Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 8th February, 1958.

SOUTH EAST NORTHUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. JUNIOR ANÆSTHETIST (Junior Hospital Medical Officer or Senior House Officer grade according to experience). Post recognised under fellowship and diploma regulations.

Applications, with names of 2 referees, to Group Secretary, Preston Hospital, North Shields.

SOUTHEND. GENERAL HOSPITAL. Applications are invited from registered or provisionally registered practitioners for the post of RESIDENT HOUSE SURGEON, vacant 9th March, 1958.

Applications, stating age, qualifications, &c. (1 testimonial sufficient from pre-registration candidates seeking first appointment), to reach the Secretary not later than 30th January, 1958.

SOUTHEND. GENERAL HOSPITAL. (262 Beds.) Temporary SENIOR SURGICAL HOUSE OFFICER required for approximately 3 months, but probably longer.

Applications should be sent to the Secretary at the Hospital by 31st January, 1958.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Applications are invited from fully registered practitioners for the post of RESIDENT HOUSE PHYSICIAN (House Officer grade). Post vacant 5th March, 1958. Appointment primarily to Pædiatric Department, with duties in Cardiological and Skin Departments. Post recognised for D.C.H.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials, should reach the Secretary at the Hospital by 30th January, 1958.

STOKE-ON-TRENT. BUCKNALL HOSPITAL. (84 infectious, 40 chest beds for children, 24 pneumoconiosis, 124 chronic sick beds.) Applications are invited for post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER, vacant 1st February. Married accommodation available. The person appointed will be associated with all departments of the Hospital and will be required to assist at the pneumoconiosis clinic.

Detailed applications, with copy testimonials, to Physician-Superintendent, at the Hospital.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. RESIDENT SENIOR HOUSE OFFICER (Casualty Officer). Post recognised for F.R.C.S. Vacant 17th February.

Applications, stating age, qualifications and experience, with copies of recent testimonials and the names of 2 referees, to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

SUTTON. BELMONT HOSPITAL. St. Ebba's and BELMONT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment of PSYCHIATRIC REGISTRAR at above Hospital, which is principally concerned with the treatment of neuroses and the early psychoses. In addition to undertaking clinical duties the successful candidate may be called upon to work part-time in the Electroencephalography Department under the direction of the doctor in charge. There are ample opportunities for research and the Hospital, which is recognised for the D.P.M., takes an active part in teaching in association with teaching hospitals. Candidates may visit the Hospital by appointment with the Acting Physician-Superintendent.

Application forms may be obtained from the Group Secretary, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the Surgical Unit of the above Hospital. Vacancy 4th February, 1958. The post is recognised under the F.R.C.S. (Eng.) regulations.

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, should be forwarded to the Secretary of the Hospital.

T. E. JONES, Group Secretary.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of SENIOR HOUSE OFFICER as Casualty Officer and Orthopædic House Surgeon at Great Western Hospital, Swindon. Post recognised by R.C.S. for 6 months of year's training under Fellowship regulations. Work of Accident and Orthopædic Department, associated with Nuffield Orthopædic Centre (Wingfield Morris Orthopædic Hospital), Oxford, includes large number of industrial injuries. Salary £819 10s. p.a., less charge for residential emoluments.

Full details and names of 3 referees to Secretary, 7, Okus-road, Swindon, Wiltshire, immediately.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. RESIDENT ANÆSTHETIC REGISTRAR required. Post recognised for F.F.A. R.C.S.

Application forms obtainable from and returnable to Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 8th February.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN for Research in Juvenile Rheumatism, vacant 15th February. Post offers scope for those interested in research, pædiatrics, rheumatology or cardiology.

Applications, stating age, qualifications and experience, with dates, with copies of 2 testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant 21st January. Pre-registration post.

Applications, stating age, qualifications with dates, and copies of 2 testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE PHYSICIAN required for post vacant 9th March. Pre-registration post.

Applications, stating age, experience and qualifications with dates, and copies of 2 testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Locum REGISTRAR required immediately until October to the Special Unit for Research in Juvenile Rheumatism at above Hospital. Post offers scope in research, pædiatrics, rheumatology or cardiology.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Locum HOUSE SURGEON required for 3 months commencing 17th January.

Apply, with copies of 2 recent testimonials, to Hospital Secretary.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required immediately. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality and age, together with copy testimonials (quoting reference F.955/84), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties as soon as possible. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long and short stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WEST DORSET GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required for West Dorset Group of hospitals, for duties in Weymouth, Dorchester and Bridport. Post vacant 1st April, 1958, and tenable for 12 months, with possible renewal for further year. Salary according to experience—£935 or £1061 10s. p.a., with deduction of £170 p.a. if resident.

Application form, which should be returned immediately, from the Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for the post of HOUSE OFFICER (E.N.T.). Post-registration appointment, recognised for F.R.C.S. and D.L.O.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. Applications invited from registered medical practitioners for post of JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics. Recognised for D.A. and F.F.A.R.C.S. The post offers wide experience, as large orthopædic and thoracic units are located in the Hospital in addition to the general surgical and gynæcological wards. Appointment may be either resident or non-resident. If resident, a charge at the rate of £170 p.a. will be made. Married accommodation may also be available.

Address written applications, stating age, nationality, qualifications with dates, experience, details of previous appointments and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. STANLEY ROYD HOSPITAL. Applications invited for post of JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER in Psychiatry. Accommodation available for a single person and may be available for a married person.

Address applications, giving full personal particulars, details of training, experience, &c., and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WALSALL. MANOR HOSPITAL. (333 Beds.) GYNÆCOLOGICAL AND OBSTETRIC HOUSE SURGEON. Post recognised for D.Obst.R.C.O.G. Vacant 1st March, 1958.

Applications to Group Secretary, Walsall Hospital Management Committee, General (Sister Dora) Hospital, Walsall.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. CASUALTY OFFICER (Senior House Officer). Modern department employing 3 full-time Casualty Officers. Post recognised for F.R.C.S. Resident or non-resident. Vacant end February.

Applications, with names of 2 referees, to the Administrator.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens SENIOR REGISTRAR in General Surgery required Swansea General Hospital for approximately 3 months with a possible extension at the end of that time.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in Pædiatrics, based Royal Gwent Hospital, Newport. Will also be required to visit neighbouring hospitals. Recognised D.C.H. Non-resident.

REGISTRAR in Anæsthetics, based at Royal Gwent Hospital, Newport, Mon (260 Beds). Post recognised F.F.A.R.C.S. and D.A. Non-resident.

2 REGISTRARS in Anæsthetics, Glantawe Hospital Management Committee area. Visits to main hospitals in group, including Swansea (403 Beds) and Morriston (501 Beds).

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WELSH REGIONAL HOSPITAL BOARD. Registrar in Anæsthetics. Based at East Glamorgan Hospital, Church Village, near Pontypridd (a modern general hospital of 316 Beds with special departments including thoracic surgery), and will also be expected to serve other hospitals in the group. Post recognised for F.F.A.R.C.S. The successful candidate will be given the opportunity of regularly attending the Department of Anæsthetics at Cardiff. Resident/non-resident. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTON-SUPER-MARE GENERAL HOSPITAL. (107 Beds.) Applications are invited from registered medical practitioners for the pre-registration appointment (resident) of HOUSE SURGEON. Immediate vacancy.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WICKFORD (near), ESSEX. RUNWELL HOSPITAL. (1032 Beds.) SENIOR HOUSE OFFICER (Male or Female) required for one of the Consultant's Divisions and to assist in outpatient work. Excellent postgraduate facilities for D.P.M. Salary £819 10s., residential charge £150.

Applications, with copies of testimonials, to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (315 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant 28th February.

Applications, with copies of 2 testimonials, to Group Secretary.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX. (210 Beds—acute general.) The post of HOUSE PHYSICIAN will be vacant in February.

Applications from registered medical practitioners, stating age, qualifications, experience, nationality, and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary immediately. A. V. OAKTON, Group Secretary,

Worthing Group Hospital Management Committee.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. HOUSE SURGEON, pre-registration post.

Applications, with names of 2 referees, to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) HOUSE SURGEON (pre-registration) required. Post vacant immediately.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) HOUSE OFFICER (pre-registration) E.N.T. Department. Post recognised for the D.L.O. and F.R.C.S. examinations. Vacant 1st March.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Secretary.

WORCESTER (near). POWICK HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident). The post offers experience in all branches of psychiatry, including all forms of modern treatment and outpatient clinics. The Hospital has a high admission-rate, is recognised for the D.P.M., and has associated Child Guidance Clinics and a Mental Deficiency Institute similarly recognised. A psychiatric hostel for women patients going out to daily work and a social therapy outpatient unit will shortly be opened. Facilities to attend at the Birmingham Medical School for instruction in neurology.

Applications, with full details and the names of 2 referees, to be forwarded to the Medical Superintendent.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the posts of HOUSE SURGEON (2) at the above Hospital, to commence duties on 1st February, 1958. The appointments are recognised for the diploma of F.R.C.S. (England, Edinburgh, and Ireland) and are pre-registration posts.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the posts of HOUSE SURGEON (2) at the above Hospital, to commence duties on 1st February, 1958. The appointments are recognised for the Diploma of F.R.C.S. (England and Edinburgh) and are pre-registration posts.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

DUBLIN. ROYAL VICTORIA EYE AND EAR HOSPITAL. OPHTHALMIC HOUSE SURGEON required for duties at the above Hospital. Appointment for 1 year from January, 1958. Salary £275 p.a. with free board, lodging and laundry. Recognised for D.O. and D.O.M.S.

Applications, with testimonials, to be forwarded to the Registrar immediately.

NORTHERN IRELAND HOSPITALS AUTHORITY invite applications for 2 whole-time posts as REGISTRAR in Psychiatry under their Special Care Scheme for persons suffering from arrested or incomplete development of mind. The terms and conditions will be in accordance with the application of the Spens Report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 14th February, 1958.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in General Surgery at hospitals managed by the Mid-Antrim Hospital Management Committee. The terms and conditions will be in accordance with the application of the Spens Report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 15th February, 1958.

CANADA. CHILDREN'S HOSPITAL, Vancouver, B.C. 2 PÆDIATRIC RESIDENTS required for 1-year period commencing 1st July, 1958, for 83-Bed children's acute and long-term medical and surgical hospital. 6 months' credit given by Royal College of Physicians and Surgeons of Canada toward certification in pædiatrics. Remuneration $175 per month less $20 per month accommodation. Married accommodation available.

Applications, stating age, qualifications, medical school, nationality, marital status, accompanied by recent references and photograph, should be forwarded airmail to Administrator, Children's Hospital, 250, West 59th Avenue, Vancouver, 15, British Columbia.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for the post of REGISTRAR in the Division of Surgery at the above-named Teaching Hospital. The successful candidate will be required to commence duties on or about 1st May, 1958. The appointment will be for 1 year in the first instance, subject to renewal. Salary will be within the scale £900–£100–£1100/£1200–£100–£1500 p.a., depending on previous experience and qualifications. Unfurnished accommodation will be provided at a deduction of 5% of salary. Return passages by sea will be paid for 1 person only, from and to the country of recruitment.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona P.O., Jamaica, to whom applications, stating age, nationality, details of qualifications and experience, together with the names and addresses of 3 referees, or copies of 3 recent testimonials, should be addressed not later than 22nd February, 1958.

U.S.A. UNIVERSITY OF MINNESOTA MEDICAL CENTER. ANESTHESIOLOGY RESIDENCIES at the above Center. 2 or 3-year programme with clinical and didactic instruction in all phases of anæsthesia. Board approval. Positions starting every month.

Address, F. H. VANBERGEN, M.D., University of Minnesota Medical Center, Minneapolis 14, Minnesota.

Public Appointments

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
CLITHEROE	.. LANCASTER	.. 8TH FEBRUARY, 1958

SECOND ADVERTISEMENT

WESTMINSTER CITY COUNCIL AND HOLBORN BOROUGH COUNCIL. Joint appointment of DEPUTY MEDICAL OFFICER OF HEALTH (permanent superannuable post). Salary £2050–£106–£2365 p.a. Applicants to be registered medical practitioners and to hold a registered public health qualification; age under 46 years at 1st January, 1958. The person appointed will act as Deputy Medical Officer of Health for the 2 boroughs. His services will be allocated in the proportion of 3/4ths to Westminster and 1/4th to Holborn.

Applications (marked "Deputy Medical Officer of Health"), stating age, war service, qualifications, present and past appointments, with names of 3 referees, to the Town Clerk, Westminster City Hall, Charing Cross-road, London, W.C.2, by 7th February, 1958.

Applications received in reply to the first advertisement will be reconsidered if the candidates so request.

COVENTRY CORPORATION require School Medical OFFICER AND ASSISTANT MEDICAL OFFICER OF HEALTH (joint post) for duties connected with medical inspection and clinic treatment of schoolchildren, maternity and child welfare work and such other duties as the Medical Officer of Health and Principal School Medical Officer may include from time to time. Qualifications/experience in ascertainment of handicapped pupils an advantage. Salary £1050–£1475. Commencing salary according to experience/qualifications.

Application forms, &c., from Medical Officer of Health, New Council Offices, Coventry, returnable without delay.

LEEDS. CITY OF LEEDS. Public Health Department. Applications are invited from suitably qualified and registered Male or Female medical practitioners for the post of ASSISTANT MEDICAL OFFICER for general work in the Public Health Department. The duties of the appointment will be mainly work in connection with immunisation and infectious diseases control. Opportunity will be given to the successful candidate to take the part-time D.P.H. course at the Leeds University if it is so desired. The Medical Officer appointed will work under the immediate direction of the Medical Officer of Health and his Deputy. Salary scale £1050 p.a., rising by annual increments of £50 to a maximum of £1475. In determining the commencing salary, due consideration will be given to previous experience and qualifications. The first increment will take effect on the 1st April following the completion of 6 months' satisfactory service. The person appointed will be required to pass a medical examination and to contribute to the superannuation fund established under the Local Government Superannuation Acts, 1937–53.

Applications, endorsed "Assistant Medical Officer", must be delivered at the Public Health Department, 25, East-parade, Leeds, 1, not later than 10 A.M. on Monday, 10th February, 1958. Canvassing in any form, either directly or indirectly, will be a disqualification.

I. G. DAVIES,
Medical Officer of Health.

LINCOLN. COUNTY OF LINCOLN. Parts of Holland. Appointment of DISTRICT MEDICAL OFFICER OF HEALTH, PORT MEDICAL OFFICER AND ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH. Applications are invited from persons qualified in accordance with the Sanitary Officers (Outside London) Regulations, 1935 and 1951, for the mixed appointment of:—

(*a*) Medical Officer of Health and Port Medical Officer for the Borough of Boston (3/11ths).
(*b*) Medical Officer of Health for the Rural District of Boston (3/11ths).
(*c*) Assistant County Medical Officer of Health (5/11ths).

Private practice will not be permitted. The salary will be determined at the time of appointment commencing at not less than £1600 4s. 6d. and rising on a scale to a maximum of not less then £1961 13s. 11d. Car allowance on the prescribed scale.

Application forms with particulars and conditions of appointment may be obtained from the County Medical Officer of Health, County Hall, Boston, to whom they should be returned by 8th February, 1958.

H. A. H. WALTER,
10th January, 1958. Clerk of the County Council.

NOTTINGHAM. CITY OF NOTTINGHAM HEALTH SERVICES. Applications invited for appointment of ASSISTANT MEDICAL OFFICER for duties which will include maternal and child health and vaccination and immunisation. Possession of the D.P.H. an advantage. Post superannuable subject to medical examination. Salary £1050–£1475 p.a. Commencing salary according to local-government experience.

Application forms to be obtained from Medical Officer of Health, Huntingdon-street, Nottingham, and to be returned to him by 8th February, 1958. T. J. OWEN, Town Clerk.

SOUTH CORK BOARD OF PUBLIC ASSISTANCE. Vacancy for SENIOR HOUSE PHYSICIAN, St. Finbarr's Hospitals. Remuneration, £676 p.a.

Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed application forms should be lodged not later than 5 P.M., on Friday, 31st January, 1958.

SOUTH WESTERN GAS BOARD. Applications are invited for the post of ASSISTANT MEDICAL OFFICER (part-time), mobile in the part of the Board's area within a radius of about 45 miles from Bath. The salary will be on the recognised scale for part-time industrial medical officers, based on approximately 8 hours per week.

Applications should be sent by 8th February to Chief Medical Officer, 9A, Quiet-street, Bath, and further particulars can be obtained from him.

GOVERNMENT OF ADEN PROTECTORATE. Applications invited from doctors with medical qualifications registrable in United Kingdom for following posts of a pioneering nature, in Aden Protectorate Health Service.

OPHTHALMOLOGIST to be based on Makhzan, Western Aden Protectorate, where there is a developing base hospital and a health service training centre, but about half time to be spent on tour in both Western and Eastern Protectorates working in hospitals, health units and in the field, and training sub-professional staff in simple eye work. Private practice allowed, but very limited. Candidates must possess F.R.C.S. and D.O.M.S. or equivalent, and practical experience in a public institution. Knowledge of Arabic and hot countries an advantage.

WOMAN MATERNITY AND CHILD HEALTH SPECIALIST to be based on Mukalla, Eastern Aden Protectorate, where there is a developing base hospital and a health services training centre, but about half time to be spent on tour in both Protectorates, working in hospitals, health units and in the field, and training sub-professional staff in nursing, midwifery and M.C.H. work generally including home visiting. There will be a matron colleague. Candidates must possess F.R.C.S. or M.R.C.O.G. and have good experience in gynæcology, obstetrics and child health. Knowledge of Arabic and service in Arab communities an advantage. Limited private practice allowed.

Appointments on contract for 1 tour of 24 months in the first instance with gratuity (taxable) of £37 10s. for each completed 3 months of service, payable on satisfactory completion of contract. Salary for both appointments £2400 a year. Following allowances also payable :—

(*a*) Outfit allowance £60.
(*b*) Education allowance for children between 8 and 18 undergoing full-time education outside Aden.
(*c*) Protectorate allowance from £144 to £168 a year.

Furnished quarters at low rental. Income-tax at local rates. Free passages for officer, wife, and up to 3–4 children under age 18. Generous home leave after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/2/010).

GOVERNMENT OF NORTHERN REGION, NIGERIA. Applications invited from doctors with medical qualifications registrable in the United Kingdom for the following appointments :—

MEDICAL OFFICERS for general duties which may include charge of a large hospital and its administration, or rural health duties which will require living under bush conditions. "R" practitioners, i.e., practitioners liable for call-up under the National Service Acts, may apply and, if appointed, will be granted indefinite deferment of call-up on completion of 2 years' service.

MEDICAL OFFICER OF HEALTH for administration of preventive medical service and control of sanitary matters (including statutory duties of a Medical Officer of Health), or if posted to an airport the duties of Port Health Officer. May be required to perform general duties of Medical and Health Officers and other duties in connection with epidemic diseases. Possible posting to undertake rural health work including medical surveys and mass treatment of endemic diseases. Candidates must possess D.P.H. Diploma in Tropical Hygiene an asset.

Appointment may be :—

(*a*) on 3 years' probation for permanent and pensionable employment. Pension (non-contributory) at rate of 1/600th of final pensionable emoluments for each completed month of reckonable service ;

(*b*) from National Health Service, officer retaining superannuation rights up to 6 years and receiving a gratuity (taxable) of 20 % of aggregate of salary. (Salary for officers appointed under (*a*) or (*b*) ranges from £1212 to £1950 p.a.) ; or

(*c*) on short-term contract (2 tours each of 12–24 months) with salary £1434–£2286, and gratuity (taxable) of £37 10s. for each completed period of 3 months' service (including leave).

Quarters provided at low rental. Taxes at local rates. Annual leave permissible ; generous home leave granted after each tour. Free passages in both directions for officer and wife ; assisted passages for children. Allowances for children of £120 a year for first child, £96 for second and £72 for third.

The Office of the Northern Region of Nigeria, Nigeria House, Northumberland-avenue, London, W.C.2, would be pleased to answer questions relating to conditions of service, climate, &c., in the Region.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/408/03).

NEW SOUTH WALES, AUSTRALIA. Department of PUBLIC HEALTH. MEDICAL OFFICER OF HEALTH, Lismore, New South Wales. Salary £A2740 p.a. Applicants must possess the Diploma of Public Health or equivalent qualifications. Duties will include the supervision and co-ordination of public health activities involving a very close relation with Local Authorities within the Richmond-Tweed Health District. The successful applicant will be responsible for the supervision of environmental sanitation and hygiene, notification and investigation of infectious diseases, conducting medical examinations, and for the implementation of policies determined by the Department of Public Health having application to the particular area. Successful applicant will be eligible, subject to medical fitness, to contribute to the New South Wales superannuation fund. First-class ship fares to Sydney of appointee and his family will be paid.

Applications (4 copies), including the names of 2 persons from whom testimonials can be obtained, should be lodged at the office of the Agent General for New South Wales, 56, Strand, London, W.C.2, by 12th February, 1958.

WALSALL. COUNTY BOROUGH OF WALSALL. Applications are invited from qualified medical practitioners for the post of DEPUTY MEDICAL OFFICER OF HEALTH at a salary of £1486 p.a., rising by annual increments of £55(4)–£50(1)–£1756 p.a. Applicants must possess the D.P.H. and should be approved in connection with the ascertainment of educationally subnormal children. Commencing salary according to qualifications and experience.

Further particulars and forms of application for the appointment may be obtained from the undersigned. Closing date for applications, Monday, 10th February, 1958.

W. STALEY BROOKES, Town Clerk.

Council House, Walsall.

YORKSHIRE. COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE. Applications are invited from registered medical practitioners, Men or Women, for the post of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER in the Brighouse area of the County. The Assistant will be on the staff of the County Medical Officer's Department but will work under the administrative direction of the Divisional Medical Officer for the area. The duties will be mainly clinical in the School Health and Infant Welfare Services, but other County health duties may be included by the Divisional Medical Officer. The scale of salary is £1050–£1475 p.a. A minimum of 3 years' experience since qualification is desirable and the possession of a Diploma in Child Health will be an advantage. Travelling and subsistence allowances according to the County Council's scale are payable in addition to salary. The post is superannuable and the successful applicant will be required to pass a medical examination as to physical fitness.

Forms of application can be obtained from the undersigned, to whom they should be returned not later than 10th February, 1958.

J. WOOD-WILSON, County Medical Officer.

County Hall, Wakefield.

General Practice

For an ***Executive Council post*** *(England and Wales) apply on form* **E.C.16A** *obtainable from the council. Mark envelope "Vacancy."*

WETHERSFIELD, ESSEX. Applications invited for retirement VACANCY. (Rural—restricted area.) List at present approximately 1300. Residence and surgery accommodation not available. Apply on Form E.C.16A by first post on 4th February, 1958, to—

E. BERGDAHL, Clerk of the Council.
Essex Executive Council, 131/3, Filebrook-road, Leytonstone E.11.

Hospital Services: Non-Medical Appointments

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY. Applications are invited for the post of SENIOR ELECTRO-ENCEPHALOGRAPHER (grade I) at the Manchester Royal Infirmary. Salary according to Whitley Council scale.

Applications should be addressed to Dr. F. R. FERGUSON, Department of Neurology, Manchester Royal Infirmary, Manchester, 13, within 2 weeks of the appearance of this notice.

Miscellaneous

Medical Officer required by Mining Company in Sierra Leone. Applicants should have wide general medical experience and ability to do emergency surgery. D.T.M. & H. an advantage. Commencing salary £2400 p.a., plus 5 % bonus plus, for married man, £10 per month marriage allowance and £5 per month for each child under 18. Salary reviewed annually. Retirement under contribution pension scheme at age 55. Tours of duty approximately 15 months followed by liberal leave on full salary in U.K. Return passage paid, free furnished quarters. Life assurance and dependants income schemes. Write, giving full particulars, stating age, married or single, to SIERRA LEONE DEVELOPMENT CO., LTD., Dept. MO.2, City-Gate House, Finsbury-square, E.C.2.

Doctors needed for construction projects in Persia, starting between now and June. 1 year contract ; longer if desired. £2200, tax-free ; transportation and living expenses paid. Considerable free time for study if desired.—Please write to PETER BURGESS, M.D., P.O. Box 1601, Tehran, Iran.

Irish Medical Association. Applications are invited for the post of Medical Secretary and should be sent on or before 12th February, 1958, to the Honorary Secretary, Irish Medical Association, 10, Fitzwilliam-place, Dublin. Applicants must hold a medical qualification.

Details regarding the post can be obtained on application to the Irish Medical Association Office, 10, Fitzwilliam-place, Dublin.

Doctor's receptionist, 5 years' experience, seeks post, preferably in the Midlands.—Address No. 359, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Canada. For disposal in Eastern Canada, general practice in lovely countryside, 25 miles from University town. Good sporting facilities. British degree accepted. Very little capital required. Selling price, less than 6 months' income, includes complete heavy house furnishings with modern kitchen equipment and all office equipment. Pleasant practice for young energetic married man. Available end June.—Reply Address No. 360, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC 0141), who are specialists.

"Pregnancy Diagnosis by the Xenopus Method", 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

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Inability to take aspirin . . .

IT WAS RECENTLY reported (*Brit. med. J.*, 1 : 444, 1957) that of 178 rheumatic patients, 25% could not take plain aspirin in adequate dosage.

Of this 25%, however, the great majority tolerated a modified aspirin such as Paynocil.

Not only are Paynocil tablets usually well tolerated by the stomach (even on the heavy dosage needed for rheumatoid arthritis), but they are extremely palatable, disintegrate instantly on the tongue without water, and cause no discomfort or unpleasant after-sensation.

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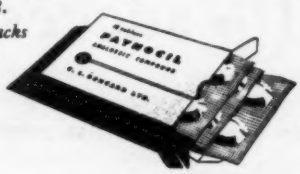

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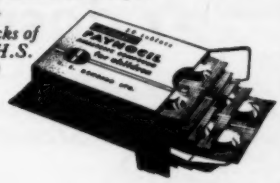

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